DOCTOR OF MEDICINE

Developing an evidenced based undergraduate otolaryngology curriculum

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Without the help, support and advice from so many people the thought of undertaking an MD would never have come to fruition. There are, unfortunately, too many to name individually but a special mention must go to my wife, Kathryn, who has been a truly incredible support throughout the process. Thank you for the understanding that you have shown during the innumerable hours I have spent at the computer and all of the help, advice and support that you have given throughout the project.

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Declaration

I, Richard Alan Steven, confirm that I am the author of this thesis. All references cited have been consulted and the work of which this thesis is a record has been completed by myself and has not previously been accepted for a higher degree.

Richard Alan Steven

Summary

Developing curricula to ensure that they are comprehensive but not overwhelming is an on-going challenge in undergraduate medical education. This research aimed to explore what we teach and why with regards to undergraduate otolaryngology.

A longitudinal transformation approach was taken to this mixed methods study. This consisted of a comparison of undergraduate otolaryngology curricula in medical schools in the United Kingdom. Following this, a survey was devised, piloted and distributed nationally to a wide range of doctors. Four main groups were targeted including foundation year doctors, specialty trainees, general practitioners and consultants. Focus groups were then undertaken to explore results obtained from the preceding studies.

The curriculum comparison provides an overview of the main topics included in undergraduate otolaryngology curricula in the UK. The comparison highlighted the large degree of variability in undergraduate otolaryngology curricula from both a content and methods perspective.

Utilising results from the curriculum comparison, a national survey was devised. Results indicated that doctors felt that medical students should be able to perform the majority of otolaryngology examination skills. They should also be able to recognise, assess and initiate management for both common and life threatening acute conditions and be able to take an appropriate history and perform an appropriate examination for the majority of otolaryngology clinical conditions but manage only a select few. The survey indicated that the region in which a doctor works does not have a significant influence on their opinion, however, there was a large degree of variation in responses depending on the post of the respondent.

Focus groups showed that variability in undergraduate otolaryngology curricula is multifactorial. Factors include resource allocation and a lack of standardisation. The focus groups highlighted that the perceived importance of a topic was an influencing factor in questionnaire responses and that this was linked to the perceived seriousness of a clinical condition, the complexity of a case and whether it would be possible to manage the condition in general practice.

The results should aid curriculum development both in terms of curriculum content and how curricula are designed. A collaborative approach to curriculum development is recommended to reduce the risk of excluding important topics. The findings may be applicable to other specialties and have implications for curriculum development in general.

Publications

Submitted

Otolaryngology Undergraduate Training in the United Kingdom - Consensus Meeting

Lloyd SKW, Narula A, **Steven RA**, Singh M, Doshi J, Saeed SR, Kumar N, Robson A, Philpott C

UK Undergraduate Consensus Group

Published

An undergraduate Otolaryngology curriculum comparison in the United Kingdom using a Curriculum Evaluation Framework

Steven RA, Mires GJ, Lloyd SKW, McAleer S

Clinical Otolaryngology, Jan 2017

Otological aspects of undergraduate otolaryngology education in the United Kingdom (abstract)

Steven RA, Mires GJ, Lloyd SKW, McAleer S

Journal of Laryngology & Otology 130(S3):S235, May 2016

In reference to qualitative synthesis and systematic review of otolaryngology in undergraduate medical education.

Steven RA, McAleer S, Mires GJ, Lloyd SKW

Laryngoscope. 2016 Mar;126(3):E134. Sept 2015.

Presentations

Oral

ENT Scotland Annual Summer meeting, Dunblane, May 2017

ENT Scotland Annual Summer meeting, Dunblane May 2016

British Association of Academic Otolaryngologists, London March 2016

British Academic Conference in Otolaryngology, Liverpool July 2015

University of Dundee Student Symposium, Dundee June 2015

Poster

Association for the Study of Medical Education (ASME), Belfast July 2016

Chole 2016, Edinburgh July 2016

University of Dundee Student Symposium, Dundee June 2016

Scottish Medical Education Conference, Edinburgh May 2016

Prize

Silver Thudichum prize, Department of Otolaryngology, Ninewells Hospital June 2017

Background

Personal

I was appointed as Clinical Fellow in Medical Education at the University of Dundee in 2014 which gave me the opportunity to undertake this research on a part time basis. I was granted 'Out Of Programme' time to undertake this post from my appointment as Specialty Trainee in Otolaryngology in the East of Scotland.

My interest in medical education dates back to the senior years of medical school when I was involved in delivering teaching to other medical students. During my foundation training I developed this interest by attending teaching courses and devising, developing and delivering a revision course for final year medical students for which I was nominated for a staff excellence award.

Following foundation training I was appointed as a Medical Demonstrator at the University of St Andrews. This one year, full time post allowed me to further develop my teaching skills and really fostered my interest in medical education.

As a result of my experiences I developed an interest in curriculum development, specifically looking at what we teach and who decides. It was the exploration of these ideas that gave rise to this project.

Project

Whilst reading about curriculum design and development in 2013 I began to think about the processes involved, who decides what we teach and what it is we want students to learn. A revelation to my understanding of these design processes came from reading Kern's Six-Step Approach to curriculum development.[1] The description of a curriculum development process starting at problem identification, through needs assessment to implementation and evaluation and feedback piqued my interest.

As will be mentioned throughout this thesis, much has been written about the curriculum development process. There is however a paucity of evidence in the literature about its use to effect medical education from a practical stand point.

Although traditionally curricula were devised at a local level by one or two interested individuals, many specialties are now producing core curricula. The design methodology of these do however vary significantly. In the latest publication of 'Outcomes for Doctors', the General Medical Council (GMC) have gone as far as to publish a list of a number of curricula in the appendix.[2] The vast majority of these, however, still rely on small, specialty-specific, consensus groups for design. In otolaryngology, at the time of conception of this project, there was no one single curriculum produced.

Although the consensus group approach may represent a step in the right direction on the continuum of curriculum design processes, can this be improved upon and who should decide what is included within a curriculum?

Aims

1. To establish what is currently taught in undergraduate otolaryngology in the UK

2. To establish what aspects of otolaryngology a medical student should learn about

3. To explore perceptions of undergraduate otolaryngology amongst qualified doctors

Research questions

The over-riding research question which we set out to answer was “what should medical students learn about otolaryngology?”. This research question in itself, however, generates many questions which must be addressed prior to developing a curriculum.

Introduction

Curriculum overload is an ever present problem in the world of medical education and has been recognised for many years.[3] Despite efforts to reduce factual overload, such as the publication of the General Medical Council's Tomorrow's Doctors in 1993, there is still a requirement for medical students to have knowledge of anatomy, physiology and other 'basic' subjects in addition to the almost endless array of medical conditions which exist and for which knowledge continues to evolve and expand.[3]

This poses a real challenge in selecting what should be included in a curriculum and what should be left out. This has led to much debate and many strategies which attempt to address this problem. A common feature of these is a move away from teaching factual knowledge and placing more of the emphasis on students acquiring lifelong learning skills which they can use in whichever their chosen field.[4] The benefit of this approach is that, rather than weighing the student down with the burden of limitless knowledge acquisition, students learn skills in problem solving, information finding and life-long learning.[5]

This assumes that more specific knowledge will be acquired at a later stage; as the learner enters their chosen area of practice. This fits well with the increasing subspecialisation seen in medicine, an example of which is seen in the specialty of general surgery. Although there have always been sub-specialty areas, such as upper gastrointestinal surgery, more recently, sub-specialties have split off and formed their own training pathways; an example being vascular surgery.[6] This is not limited to surgical specialties, with cardiologists calling for increased subspecialisation in medical specialties.[7]

There does however remain a need for students to be exposed to a wide range of specialties at an undergraduate level for a number of reasons. Students are still required to gain an understanding of the body as a whole. Perhaps one of the most important reasons for this is that the majority of medical graduates will go on to become generalists i.e. general practitioners.[8] General practitioners require a wide base of knowledge and skills to effectively deal with 'whatever comes through the door'. Their knowledge and skills require to be broad and wide ranging and yet their postgraduate training remains the shortest of any postgraduate specialty.[9]

In contrast to the direction of travel towards increased specialisation, the current political climate calls for increasingly versatile doctors who are able to care for a wider range of medical conditions which may be seen in an aging population. This is exemplified in the Shape of Training review and is currently a subject of great debate.[10, 11] European working time regulations have also led to increasing 'cross-cover' between specialties.[12] This necessitates junior doctors to provide cover for a wide range of specialties sometimes without so much as an induction.[13] There are, of course, more experienced doctors to ask, however even basic ward care requires a basic understanding of a specialty.

It therefore remains important for undergraduate medical students to be exposed to a wide range of topics at medical school. But how do we avoid curriculum overload? How do we ensure that what medical students are learning is necessary? How do we devise medical curricula to ensure that content is relevant?

Defining intended curricular achievements

It is not the intention of this thesis to detail all aspects of curriculum design as this has been done by a number of esteemed authors before.[14-16] It is however of use to describe key issues which have shaped the perspective of this thesis.

For 20 years, outcomes based education has been widely discussed in the medical education literature. The idea is that curriculum are designed to account for the product (the end point) rather than the process.[17] It “defines what we expect of our graduates”.[16] This approach provides a “clear and public statement of the learning outcomes” of the programme.[17] This has the benefit of making the outcomes clear to all intended, but also helps inform decisions about educational strategy and resources.[17] Harden[17] lists a number of advantages of an outcomes based approach. These include accountability, clarity, flexibility in terms of educational strategies and that outcomes can be used to guide assessment.[17]

More recently, competency based medical education (CBME), entrustable professional activities (EPAs) and milestones have come to the fore.[18-20] Although competency based education is not a new theme, it has been within the last 10 to 15 years in which it has gained significant traction and prominence within medical education.[21, 22] Competency based education has been defined as an “outcomes-based approach to the design, implementation, assessment, and evaluation of medical education programs”.[22(p.641)] In the postgraduate field at least, there is evidence to show that CBME can lead to faster acquisition of procedural skills, can form a valid approach to assessment and may lead to an improvement in patient care.[23] Evidence of the benefits at an undergraduate level however, are still scarce.

There have however, been a number of criticisms of CBME. These can be divided into conceptual and theoretical issues.[23, 24] It is thought that the concept of CBME is related to 'behaviourism' and may lead to a "reductionist" approach, i.e. competencies cannot describe "complex human behaviours".[24] It is also felt that CBME does not appropriately deal with the knowledge elements of curricula and that it causes a 'race-to-the-bottom' approach by simply defining a minimum standard.[25, 26] It is also argued that it may actually cause issues with assessment, as it may not relate accurately to reality.[24] Additionally, there are a number of practical issues associated with CBME in terms of the planning and resources required.[23, 24]

Entrustable professional activities (EPAs) and milestones have been seen as a way of improving the relevance of competency based medical education. EPAs relate to a decision of trust, i.e. when a supervisor is able to trust a student or trainee to have the ability to perform a certain task.[19, 27] Milestones relate to steps along a continuum on route to a competency.[20] Touchie and ten Cate propose the need to integrate competencies, entrustable professional activities and milestones to a make them meaningful and avoid returning to long lists of behavioural objectives which become impractical.[24]

As can be seen, much time has been spent debating terminology and the differences and similarities between objectives, outcomes and competencies. The main goal, however, should be about creating "intended achievements", no matter which term is used, which are fit for purpose with the aim that they should [28(p.11)]:

- inform learners of what they should achieve
- inform teachers of what they should help the learners to achieve
- be the basis of the assessment system, so that everyone knows what will be assessed

These aims correlate with many of the benefits associated with specifying learning achievements. There are benefits to learners in defining what is expected. There are benefits for teachers and faculty in understanding curriculum goals which can help with planning. There are benefits for assessment purposes in improving their validity. Additionally, there are benefits in terms of transparency of curricula which opens up the potential for students to be able to move between institutions by creating clear areas where curricula are comparable.[29, 30]

Carraccio *et al.* describes a step wise approach for developing competencies.[18] This starts with identifying a competency before moving onto defining the components of the competency and the performance level for this. This links to the features of a valid assessment. First it must be possible to define a topic for which the student should be competent and then also identify what a student should be able to do to with regards to that topic.[31] Competencies are often defined on a continuum from novice through to expert or mastery.[32, 33]

Outcomes frameworks such as CanMeds[34] and the Scottish Doctor[35] are rarely specific enough to be able to define competencies or outcomes at a specialty level. By their very nature they are overarching documents. This once again raises the question of how we define what the expected performance level of a student for a given specialty actually is? In this research thesis, the aim is to define performance levels in terms of intended learning achievements, which can be thought of as functional competencies; tasks related to reality.[36, 37]

Exact terminology such as aims, goals, outcome and objectives will be avoided as it is felt that the results should be flexible enough to be able to be utilised for any approach taken within a given setting.

Methods of specialty curriculum development

There are many methods for developing curricula and particularly, for establishing curriculum content. Traditionally an individual or a small group of individuals was responsible for devising curricula. Even out with medicine, a study looking at curricula within schools in the United States of America (USA) showed that it was mainly the principle who decided curriculum content with some input from teachers.[38]

Although there has been a move away from individuals or small groups designing large curricula, individual specialty curricula are often still developed and adapted by those overseeing that particular element of the course.[39, 40] Often content has been established and updated on a rolling basis. Larger changes may occur when a teaching lead changes or someone new is appointed to the department who has an interest in education. The majority of students are more likely to use the knowledge and skills that they learn in an allied area or specialty, such as general practice, however, the information they receive is likely to have a bias towards a specialist's point of view. This risks the curriculum not accurately reflecting areas of knowledge and skills which is required for practice.

More recently, a number of specialties have published standardised curricula.[41-44] The General Medical Council (GMC) lists a number of specialty curricula in their latest standards for medical students.[2] A review of the 19 curriculum documents listed in appendix two of the GMC's Outcomes for Graduates document shows that a variety of people were involved in the development of these curricula.[2] These ranged from specialists from the area for which the curriculum was to be devised through to involvement of diverse groups of people from out with the specialty.[45, 46]

A number of techniques including Delphi techniques, nominal group techniques and consensus group statements were used to develop the content in these curricula.[44, 46-48] Often, however, when consensus group statements are examined, the exact methodology of defining the curriculum can be difficult to establish from publications.[46]

Mixed method techniques have also been proposed and utilised for developing curricula.[49-51] These have the advantage of incorporating a variety of techniques which may better address some of the difficulties associated with curriculum development.[52] Mixed methods techniques can be of use when designing studies looking at curriculum development as results from previous studies can be utilised to inform subsequent study design and to address questions generated by previous parts of a study.[53] They can also help expand the breadth of a study by selecting the most appropriate method i.e. quantitative or qualitative, to answer a research question. Other benefits include the ability to triangulate data, i.e. corroborating findings obtained by a different method of study.[53]

Schifferdecker *et al*. [52] describe four main models into which mixed method studies fall. One such model is a longitudinal transformation approach, where quantitative and qualitative data are collected sequentially.[52, 54] This allows for the expansion of quantitative results to aid understanding and further the aims of a study.[54] Coady *et al.* [49] used a longitudinal transformation approach to define a core set of clinical skills for medical students. This study began with focus groups exploring the views of clinicians, which informed the content of a subsequent questionnaire. Another study used a mixed methods approach, incorporating a survey, a practice audit and expert opinion, to aid development of a thrombosis medicine curriculum.[51]

Undergraduate otolaryngology

A number of recent papers have highlighted the mismatch between the time in the curriculum dedicated to undergraduate otolaryngology and the large volume of otolaryngology cases encountered in general practice.[55-57] Despite the limited time that otolaryngology occupies within the undergraduate curriculum it is the third largest surgical specialty behind orthopaedics and general surgery.[58] These issues are not specific to the UK as similar findings have been reported in the United States of America and Canada.[59, 60]

Otolaryngology contributes to a large proportion of a general practitioner's workload. Studies report that 10-25% of adult and up to 50% of paediatric consultations in general practice relate to otolaryngology topics.[56, 61-63] In addition, a large proportion of UK medical graduates go on to become general practitioners. The Department of Health in the UK published a mandate in 2013 which called for a target of 50% of medical graduates to enter general practice.[8] Otolaryngology therefore forms an important part of the education of general practitioners. In addition, for the 50% of graduates not entering general practice, medical school may be a doctors' only exposure to otolaryngology. This has implications from both a careers and recruitment perspective and also in view of the 'cross-cover' of specialties which is required of many newly qualified doctors.[12, 64]

So there appears to be a perception that otolaryngology as a specialty is inadequately covered at an undergraduate level. It also evident that otolaryngology topics appear in a variety of postgraduate settings and specifically general practice. An in-depth literature review was therefore carried out to examine in detail what is known about undergraduate otolaryngology in the published literature.

Literature review

A systematic review of the literature was undertaken relating specifically to otolaryngology in the undergraduate curriculum. This utilised the basic structure as recommended in the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Statement as a guide.[65] The PRISMA guide was modified to take account of specific recommendations relating to literature reviews in medical education.[66]

This literature review aims to establish what is currently known about otolaryngology curricula and frame this in relation to curriculum design within the context of developments in education more widely. In doing so it provides the foundation on which this project was based.

Search strategy

Eligibility

All published work which met the required search terms as outlined below was included in the review. This was to ensure that a broad perspective of otolaryngology at an undergraduate level was obtained.

Information sources

The PICO (population, intervention, comparison and outcome) tool is often used for generating components of a research question.[67] Haig and Dozier's modification of PICO was used to generate topics for the literature review (*Table 1*).[68] Their modification applies more specifically to medical education research and consists of; participants, educational aspects and outcomes.[68]

Table 1: Showing literature review topics identified using the Haig and Dozier method [68]

Area	Topics
Participants	Undergraduate Medical students
Educational aspects	Curriculum design Curriculum development Needs assessment
Outcomes	Curriculum Outcomes based Competency based Core curriculum Evidenced based

Searched databases included MEDLINE (via PubMed), ERIC, MedEdPortal and LearnTechLib (formerly EdITLib).[69-72] Other sources were used to locate additional records. These included citation searching, a basic Google search and Google Scholar. This ensured a wide and varied search.

A search strategy was then devised using key terms identified from the research question. A number of key related articles ('target articles') were reviewed to ensure all appropriate terms were identified. Terms included; undergraduate; medical students; evidenced based; curriculum development; curriculum, needs assessment.

Following this, MeSH (Medical Subject Headings) terms were identified using the online MeSH browser (*Table 2*).[73] The MeSH terms were; undergraduate; curriculum; otolaryngology. The term 'education' forms an umbrella term for many of the other key terms. It was explored to ensure that no significant papers were missed but it was not formally included as the search results were not specific enough and the terms outlined below were more accurate for providing relevant search results.

Table 2: Showing MeSH terms and additional terms used in literature search

MeSH terms	**Additional terms**	
Undergraduate medical education		
Medical students		
Education	Curriculum / Curricula	Competency-based education Content Learning objectives Learning outcomes Core Design Development
	Needs assessment	
Otolaryngology	ENT Otorhinolaryngology	

Search strategies differed between databases due to differences in key words and abbreviations. MeSH terms were used to search Medline (PubMed). Medline (PubMed) was also searched for other key terms (*Table 2*) to ensure that recently published articles were retrieved. This was deemed necessary due to the increase in medical education publications and specifically the increase in the number of publications related to otolaryngology and education in recent years. An English language filter was applied to the PubMed search. This excluded 20 papers in total.

MedEdPortal, ERIC, EdIT library and Google searches utilised the above MeSH terms or key words to ensure a broad and encompassing search. MedEdPortal was limited using 'Health Profession Specialties' (Medical). No filters were applied to ERIC or LearnTechLib. Google Scholar was sorted and screened by relevance.

No publication date limits were applied to any database search. Boolean operators were used to both expand ('OR') and restrict ('AND') the search. An initial literature review was undertaken in August 2014 with a final review of the literature completed on the 2nd of June 2016.

An example of the Medline database search (via PubMed) is as follows:

Search 1

Medical students OR Undergraduate medical education AND otolaryngology AND education

Search 2

Undergraduate medical education OR medical students AND Needs assessment AND Otolaryngology

Data Collection

All searches were conducted by the principle author (RS). *Table 3* outlines the number of records identified from each source. Initially, titles were screened. This was followed by an abstract review of all potential papers for inclusion. Any relevant articles were then read in full. Papers not available were requested via University of Dundee library services and from authors directly. Copies of historic articles were requested from journals when required.

Table 3: Number of articles identified by literature search

Database	Number of records identified
PubMed	273
ERIC	74
MedEdPORTAL	7
LearnTechLib	8
Other source	5

Initially the article title was used to exclude any records which were clearly irrelevant. The remaining number of records are displayed in *Table 4*.

Table 4: Number of records remaining after 'title' screen

Database	Number of records after initial 'title' screen
PubMed	95
ERIC	3
MedEdPORTAL	2
LearnTechLib	1
Other sources	2

The abstracts of the remaining articles were then read and 70 identified as being relevant to the research question. *Table 5* displays the number of records left after the 'abstract' screen and therefore read in their entirety.

Table 5: Table: Number of articles identified by abstract screen

Database	Number of records after 'abstract' screen
PubMed	68
ERIC	1
MedEdPORTAL	0
LearnTechLib	0
Other sources	1
Total	70

Following this search, one duplicate record was identified and removed. The remaining 69 papers were read in full. A total of 29 papers were identified which specifically related to curriculum development and learning achievements in undergraduate otolaryngology.

The majority of these papers come from the United Kingdom, the United States of America or Canada. Although this allows comparisons to be made, some caution must be exercised due to the different structures of both undergraduate and postgraduate training in these different countries.

Kern describes six steps in curriculum development; problem identification, targeted needs assessment, goals and objectives, educational strategies, implementation, evaluation and feedback.[1] As the focus of this work relates to defining curriculum content, the literature review has been divided into the three initial stages. The targeted needs assessment is addressed last to illustrate the move in the otolaryngology literature to curriculum development by needs assessment.

Problem identification and general needs assessment

In 1964 the author of an opinion piece stated that one issue of concern to otolaryngology consultants in the United Kingdom was the "low level of ENT know-how" amongst medical graduates.[74] Foxen felt that these problems, evident at a postgraduate level and although multi-factorial, could be addressed by improving the "position of otolaryngology in the undergraduate 'spectrum'".

From the very first papers published on otolaryngology undergraduate education right through to the most recent papers, authors have identified a perceived lack of otolaryngology in the undergraduate curriculum as a significant problem. The most commonly reported problem is the lack of teaching time for otolaryngology within the overall undergraduate curriculum.[61, 74-76] A number of articles from

1964 right through to 2012 have looked at the amount of time a student receives tuition in undergraduate otolaryngology.[55, 56, 74, 76] Many of these studies have used surveys, either of medical school faculties or of medical students and graduates to determine the ‘volume’ of otolaryngology in a course.

A questionnaire published in 1964 examined the teaching time dedicated to otolaryngology in the undergraduate curriculum in medical schools in the UK.[74] The results showed that in London hospitals, students received 42 hours of otolaryngology tuition and those in the ‘provinces’ (of the UK) received 47 hours. This was compared with figures obtained from various other countries which showed that considerably more time was dedicated to otolaryngology teaching. Examples included 80 hours in Sweden, 126 hours in Finland and 170 hours in the United States of America.

Although there was no detailed description of the survey (who the participants were or the methodology), the study demonstrated that differences existed and highlighted the need for further study. The author acknowledged that teaching time was a crude measure of the educational experience and does not assess the quality of the teaching received. Although this paper mainly discusses a personal opinion with some input from survey responses, it is useful as it identifies a point when people began to publicise the issues affecting otolaryngology undergraduate education. It highlights that there were concerns surrounding the education which medical students received in otolaryngology.

Despite these early concerns regarding time dedicated to otolaryngology in the curriculum, undergraduate otolaryngology education remained variable. In 2004 a survey of UK medical schools found that 22% did not have a formal otolaryngology placement in their curriculum.[56] In those schools which did offer a compulsory placement, the average duration was 7.4 days. Results from a similar study from 2012 showed that 34% of UK medical schools did not offer a formal otolaryngology placement.[55] Three schools chose not to participate in this study however, and therefore it is not possible to tell if this represents an actual increase or not. A Canadian study showed similar results with only 38% of the responding medical schools including a compulsory otolaryngology attachment.[77]

Another opinion piece from 1964 theorises that this perceived lack of otolaryngology at the undergraduate level was due to the tradition of 'general' surgery being the "foundation" of surgical teaching at medical school and how, in the past, the general surgeon could "turn his hand" to any condition.[78] With increasing subspecialisation of the general surgeon however, other areas of the body were being marginalised and were therefore poorly represented within the curriculum. The author felt that this was compounded by the dominance of general surgeons on examination boards.

In 1979, a paper based on the Presidential Address at the Laryngology Section of the Royal Society of Medicine was published which acknowledged the trend away from producing an "omnicompetent safe practitioner" to one who would "go on learning throughout his career".[61(p.551)] The author concluded however, that due to the lack of postgraduate training positions in otolaryngology that the bulk of the future general practitioner's otolaryngology experience would be gained at an undergraduate level. The authors' feelings were that this was not possible due to the "inadequate" time given to otolaryngology in medical schools.

The lack of postgraduate training positions identified in this paper has been discussed by others as well. It was felt by some that otolaryngology was essentially a postgraduate subject.[79] In 1986, MacKenzie and Hardcastle proposed that otolaryngology should perhaps be moved entirely to the postgraduate domain due to the very limited time dedicated to its study in Scottish medical schools and the pressures that its inclusion placed on clinicians.[79]

Although there are opportunities to make up for the under-representation of otolaryngology at an undergraduate level (some schools providing no undergraduate otolaryngology), only 16-26% of general practice trainees actually rotate through an otolaryngology post at a postgraduate level.[55, 62, 79-81] It could be argued that experience of otolaryngology conditions in general practice alone could make up for this deficit but studies have shown that general practitioners feel that their training was inadequate and that they would like more training in otolaryngology.[62, 81, 82] One hundred and eighty nine general practitioners responded to a survey by Veitch *et al.* in 1992.[81] Although 23% had attended otolaryngology clinics or courses, 85% would welcome further training. In 2007, Clamp *et al.* found that, of 357 responses from general practitioners, 70% had some form of postgraduate training in terms of either hospital placements (26%) or courses (61%) but only 45% felt this was adequate, the majority of which (74%) were from respondents who had held an otolaryngology post.[82] A survey of general practitioners in 2013 about their otolaryngology education found that 84% felt that there should be more emphasis placed on otolaryngology at an undergraduate level.[62]

This is not an issue confined to general practice as other frontline specialties which encounter otolaryngology conditions also express concern toward their otolaryngology education.[83] In 2006, Sharma *et al.* found that 45% of accident and emergency senior house officers had received no postgraduate otolaryngology training and the majority of those that had, had received between two and four hours.[83] This was despite 90% of these senior house officers reporting that their previous otolaryngology teaching was directly relevant to their work. Seventy five percent of the respondents felt that they had not received enough otolaryngology teaching at an undergraduate level.[83]

As with MacKenzie and Hardcastle, others cite pressures on clinicians and the large student to faculty ratio as barriers to introducing more otolaryngology.[75, 79] With medical students numbers in the UK almost doubling between 1996 and 2012 these pressures are likely to grow.[84] Utilising technology has been proposed as a potential solution to these growing pressures although caution has been urged until the efficacy of these can be assessed.[75]

Fung aimed to demonstrate current deficits in undergraduate otolaryngology education as well as assess innovations and propose a process of standardisation of learning objectives.[75] He provided a review of the 10 preceding years and stated that both medical educators and learners feel that otolaryngology teaching is lacking at the undergraduate level. This shows that in 2015 the same perceptions of otolaryngology education remain.[82, 83, 85]

Goals and objectives

Determining the intended achievements of a curriculum is key to planning the educational experience for the student. Kern *et al.* describes this as a critical step in curriculum development as the goals “help to determine curricular content…”.[1] Given the on-going “paradigm shift” in medical education from the process driven structure of courses to one which focusses on outcomes and competence, it is of particular interest to look at how goals and objectives relating to otolaryngology are portrayed in the literature.[18]

In the ‘problem identification’ section above, several papers discuss the volume of otolaryngology in a curriculum defined either by the hours or days spent in the specialty.[55, 56, 74] No studies to date have used learning achievements to examine curricula. This indicates that there remains a focus on process rather than outcome. Clearly the process is important and helps define faculty and resource requirements, however, defining the requirements of students is a key educational step which then allows the steps required to achieve these outcomes to be defined, taking into account local resources and how the outcomes relate to the rest of the undergraduate curriculum.[1, 17] This is not to say that outcomes have not been mentioned in otolaryngology education literature. Several studies have looked at defining outcomes through the use of surveys and consensus methods and these will be explored further in the 'targeted needs assessment' section below.[43, 60, 86]

Going back to the first published papers on otolaryngology curriculum content, a 1964 opinion piece stated that the broad aims of teaching should be to equip the medical student for general practice and stimulate a few to take up the specialty as a career.[78] They felt that these aims had not been met and that although this may be due to the short-comings of the teachers it was more likely to be due to the organisation of medical education at that time.

Another early opinion piece proposed that students should be provided with knowledge of the symptoms and treatment of common diseases of the upper respiratory tract, "particularly those which threaten life".[61] Neil states that students should also acquire "some skills in the proper examination of the area".[61(p.552)]

The use of the word "some" indicates the lack of structure which was applied to curriculum content. Despite this, there was an understanding that certain aspects required more emphasis and there was an acknowledgement of the GMC's recommendation that teaching should be "confined to general principles". Acute conditions and examination skills are recurring themes when looking at descriptions of what to include in curricula.[43, 60, 61]

Some authors published papers extolling the virtue of their own programme and describe what they teach and how they teach it.[40, 87] Campisi *et al.* make direct reference to the pressures on the undergraduate curriculum and the need to justify their time allocation within the curriculum.[87] Despite this problem being documented in these papers, authors rarely provide information on how the objectives were defined nor provide any meaningful data on the quality of the teaching. Often, it seems, departments and individuals are keen to explain about what they think or do, without providing evidence for what is taught or any evaluation of the education provided.

Authors describe topics which they deem important for students to learn.[40] Alberti specifically mentions teaching relating to "such minor emergencies as epistaxis, aural wax and quinsies".[40(p.725)] The example timetables provided in their paper illustrate a focus on examination skills, common conditions and emergency otolaryngology conditions. Although the exact way in which the curriculum content was set out was not mentioned, individuals involved in teaching are directly quoted. This again suggests that those individuals who had an interest in education were the ones who decided which topics were taught.[40]

Wark's 1964 paper does however suggest that there was an attempt at gaining a wider consensus on what was taught.[88] In this there is a description of recommendations for what to include in a curriculum as determined at the 1959 Oto-Laryngological Society of Australia.[88] This describes a curriculum including a structure for lectures, tutorials and demonstrations. It contains a list of "Suggested Subject Groupings" which includes "Essential knowledge" of, for example, otitis externa, epistaxis and tonsillitis. Additional groupings include "Essential skills", including the use of a headlight and "Dangers to be anticipated" which are essentially 'red flag' symptoms of disease. The paper provides a guide as to the topics but gives no recommendations on which aspects of these topics should be included. A paper describing the otolaryngology course at the University of Newcastle upon

Tyne also makes some reference to discussions relating to undergraduate otolaryngology education at the Section of Otology of the Royal Society of Medicine in 1964, however, no specific mention regarding consensus on what to teach was included.[40]

Behaviourally based objectives were just beginning to be discussed around the mid-1950-60s, at the same time that these early papers describing otolaryngology teaching content were published.[89, 90] Despite this and the title of Wark's paper "ENT Undergraduate Teaching- Objectives and Methods", these papers are devoid of formalised topic or objective lists.[88] Instead, general areas and suggested topics for study were recommended. A structured approach was actively dismissed by Alberti and Dawes: "Lectures are not of any fixed length or structure".[40] Right through to 1986 when Konrad published an editorial from the USA entitled "What should medical students learn about otolaryngology- head and neck surgery" only general recommendations were issued.[91]

Even in 1988, a survey of final year medical students by Rivron and Clayton concluded that they were "left wondering what a 'trainee doctor' needs to know about otolaryngology".[92] The answer proposed was for teaching to "concentrate on basic skills and potentially life threatening conditions" but that this approach would require further knowledge to be gained at a postgraduate level.[92]

Targeted needs assessment

An editorial published in 2001 by Clarke and Fenton acknowledged the changing times in undergraduate education and how this would affect otolaryngology.[93] They described the change to a "core with options" model i.e. students cover a common 'core' curriculum and select other optional components during their undergraduate training. They called for otolaryngologists to "accept the new order" and help ensure it worked for students. The significance of this editorial was that it was published in Clinical Otolaryngology. This is a widely distributed and read (amongst otolaryngologists) UK based journal. This prominent call for otolaryngologists to embrace education reflected what was going on more widely in undergraduate education, particularly in the UK, following calls from the GMC to move away from large volumes of factual information.[3]

Evidence for this move to a 'core' curriculum is seen in a number of papers. Those involved in curriculum design began to try and define what achievements were required of students by the point of graduation. Carr *et al.* discuss the need for departments to justify access to curriculum time and others talked of the need to use time more efficiently.[86, 92] Certainly, from around this time a number of authors began to look at what defined a 'core'.[60, 86, 94, 95] Different groups took different approaches to this with some examining the overall otolaryngology curriculum and others looking at specific elements within it.

Many of the earlier papers on undergraduate otolaryngology make reference to the fact that the purpose of the teaching is to educate students in basic principles with the intention of equipping them with the knowledge and skills required for general practice.[91, 92, 96] Some of the papers do suggest that a general practitioner's entire otolaryngology knowledge need not necessarily be gained at an undergraduate level and that a "2-stage" approach may be desirable due to time constraints.[92] It was not until 1989 however that there was any evidence in the literature that the needs and views of general practitioners (and other primary care physicians) were taken into consideration.[86]

In 1989, Ganzel and Martinez surveyed otolaryngology directors as well as residents and primary care educators.[97] They asked participants to rate 125 knowledge and skills topics from "not important" through to "important" in terms of having an "in-depth degree of knowledge in area". Participants were alumni from four medical schools in the United States of America and topics were chosen from otolaryngology textbooks and "those included in the current guidelines for undergraduate education in otolaryngology" but no reference was provided and no record of these guidelines can be located.

One hundred and forty responses were received in total with 24 of these coming from primary care educators. No subgroup analysis was undertaken to establish if differences existed between groups. The most highly ranked topics were acute otitis media, otitis media with effusion and airway obstruction. This correlates with the common themes seen in earlier papers, namely, common and life threatening conditions. This was, however, the first paper to provide evidence for the inclusion of these topics.

Carr *et al.* performed a further needs assessment for undergraduate otolaryngology in 1999 by surveying family doctors and community otolaryngologists in Canada.[86] Forty six otolaryngologic topics were examined and responses were received from 123 participants. The aim was to determine what a graduating student should know about otolaryngology. The result was a list of 24 topics deemed "important" or "vital" to include in an undergraduate curriculum. Examples of the topics included in the survey are:

1. Allergic rhinitis- diagnosis and management
2. Sinusitis- chronic vs acute, related factors, medical therapy
3. Sudden hearing loss- diagnosis, early management

No mention of how this list was generated was included in the paper. All of the listed medical authors were specialists. This therefore risks the introduction of bias due to the list of topics being generated by specialists alone. This could lead to the omission of topics deemed important by non-specialists. In response to a 1964 survey on undergraduate otolaryngology education a doctor replied that it would be "quite impossible for the proper emphasis to be given to the prospective general practitioner by a hospital-bound consultant".[96(p.33)]

The authors themselves allude to this risk of bias in their results as they note that for many of the topics there was a statistically significant difference between responses from family physicians and community otolaryngologists indicating a difference in opinion about what should be included in an undergraduate curriculum. Some effort was made to mitigate this with an option to select another topic; listed as "Other (please be specific)". This suggests that a free text option was available, however, with other surveys listing in excess of 100 otolaryngology topics there is a risk that the limited list produced was biased toward learning achievements defined by specialists.

The topics themselves were also listed in such a way that there was potential for ambiguous responses. Participants were asked to give a single response for multiple components within each individual question, as can be seen from the examples of topics from their study listed above. This has the potential to lead to a misrepresentation of participant's responses. The examples listed above also show that the emphasis lay in clinical conditions and particularly the knowledge elements of these. There is no mention of other factors such as skills or attitudes.

Almost a decade on from the needs assessment by Carr *et al.*, Glicksman *et al.* performed a further needs assessment of family medicine residents in Canada.[60, 86] They aimed to establish how comfortable residents were with 49 otolaryngology topics. The conclusion was that they showed a "lack of confidence in managing conditions that are common, life threatening, or treatable…".[60]

The authors discussed that these perceived gaps in the resident's education could potentially be addressed during their residency training but concluded that as half of the participants in the study were shortly due to complete their residency training that this was not currently a reality. These findings are similar to the experiences noted in other countries. Similar discussions regarding the timing of otolaryngology education have been discussed in the United Kingdom with the aim of addressing perceived inadequacies in undergraduate otolaryngology education.[79]

In the needs assessment by Glicksman *at al.*, all participants were at least “somewhat comfortable” with all otolaryngological skills.[60] With regards to the management of otolaryngology conditions, participants indicated that they were “not comfortable” with the management of only five conditions:

1. Congenital disorders of the neck, mouth and pharynx
2. Facial plastic surgery
3. Head and neck cancer staging and management
4. Nasal neoplasms
5. Temporal bone fractures

Although the authors conclude that there was a lack of confidence amongst family physician residents with regards to otolaryngological conditions, the responses do not necessarily reflect this, especially as the topics with which they deemed themselves “not comfortable” are unlikely to be encountered in a family practice setting. Further investigation would be required to determine whether these were actual learning needs or requirements at an undergraduate level.

The paper by Glicksman *et al.*, as with Carr *et al.*, does not describe how the topics for the survey were devised.[60, 86] Unless a meticulous method of devising topics for inclusion in any survey is utilised there is a risk of introducing bias from the outset of the needs assessment process. Additionally, the studies were conducted in one single area. Although the authors did not attempt to devise specific learning outcomes or objectives in their paper, care must be taken if the results from these needs assessments are to be generalised.

In 2009, Wong and Fung surveyed directors of otolaryngology, family medicine and emergency medicine as well as community otolaryngologists from medical schools across Canada.[85] The top five topics identified were otitis media, rhinitis and sinusitis, sore throat, peritonsillar abscess and tonsillar disease. The ability to take a focussed history and perform an examination of a neck lump were the most highly rated skills. This more widely distributed survey allows responses to be compared to other more localised ones and therefore provides additional evidence for topics for inclusion within an undergraduate otolaryngology curriculum.

Mishra and Deshmukh used a questionnaire to measure Indian medical students' confidence in 12 otolaryngology emergencies and examination skills.[98] The aim was to provide data from India regarding the adequacy of their medical school's otolaryngology education and training. The study showed that students at their institution lacked confidence in "diagnosing ENT disorders and performing basic skills" following their otolaryngology attachment. The questions in the survey again appear to have been written by the authors themselves and were from a single institution. Although the questions relate to common emergencies and skills, only medical students were surveyed and therefore it is difficult to draw conclusions about generalised learning needs in otolaryngology. It would therefore be difficult to extrapolate these findings to other schools.

Some authors have looked at more specific aspects of otolaryngology to try and determine learning achievements.[94, 99] Lee *et al.* looked specifically at learning objectives related to attendance in otolaryngology theatres.[99] They asked students what they expected to learn in the operating theatre with the aim of defining learning objectives relating to theatre attendance. This is in keeping with the

General Medical Council in the UK, which makes it clear that medical students should be involved in the curriculum design process.[100]

Although defining learning objectives was not a primary intended outcome of the work by Lee *et al.*, this approach firmly places the student at the heart of the process. The objectives, as defined by the students, do match with some of those deemed important in other studies.[43, 95] Based on the most commonly mentioned objectives, Lee *et al.* produced recommendations for learning objectives which include [99]:

1. to observe common ENT operative procedures
2. to learn clinical anatomy of head and neck
3. to learn management of common ENT diseases
4. to understand indications and contraindications of various surgical treatments
5. to learn risks and complications which may arise from operative procedures

Following the move towards the 'core with options' model in medical education, Student Selected Components (SSCs) were introduced into undergraduate curricula.[5, 101] In 2007, Newbegin *et al.* set out recommendations for students under-taking a SSC in otolaryngology.[94] Although, by its very definition, SSC learning objectives go beyond what might be expected from a core curriculum, this paper has been included in this review to highlight what Newbegin *et al.* thought was additional to a 'core'.

Newbegin *et al.* states that although it is useful to have a syllabus for SSC students, individual learning needs should be discussed with each student.[94] A sample programme is included in the paper but no specific objectives are listed. The programme includes a list of skills to be acquired during the placement with examples including “history taking” and “examination skills”. In addition to many of the objectives listed in other papers, skills such as nasendoscopy and microscopic examination of the ears are listed. Although no reference is made to how these objectives were derived, this clearly gives the student a more in-depth experience in otolaryngology using specialist equipment which is normally only available in secondary care.

Greene *et al.* describe a voluntary summer programme run in Canada for students between their first and second years of medical school.[102] Four simulation ‘stations’ are described for otolaryngology comprising of topics such as epistaxis. Each station had a list of ‘goals’ under the headings of knowledge, skills and attitudes. Again, no mention is made of how these goals were derived although it is stated that these were “closely tied to the UME curriculum objectives”.[102] The objectives are detailed and perhaps reflect that this is an additional, voluntary programme. An example of two of the twelve objectives for the peritonsillar abscess station are:

1. Compare and contrast the clinical presentation, diagnosis, and treatment of tonsilloliths, peritonsillar cellulitis, PTA and mononucleosis.
2. Incise and drain a PTA.

Although it can be seen from this literature review that personal opinion still dictates learning achievements in many areas, it can also be seen that other methods of curriculum design and development have been utilised. In 2012, Doshi and McDonald used a two stage Delphi technique to determine the “basic surgical knowledge a medical student or junior doctor should be familiar with in otolaryngology”.[95] The aim was to establish the content of an educational website. A range of participants were involved including otolaryngology consultants and trainees, junior doctors, general practitioners and medical students. Participants were all from the same geographical area (west Midlands, England). The study looked at three specific areas:

1. Observing an operation
2. Knowing about complications
3. ENT emergencies

Seven operations and six emergencies were identified from the Delphi study.[95] They included common operations such as adenoidectomy and tonsillectomy and emergencies such as epistaxis and tonsillitis. The authors discussed the use of a "bottom up" approach in addition to the traditional "top down" approach used in curriculum design where 'experts' within an organisation define objectives based on their opinion of what students should know. The inclusion of this bottom up approach was to ensure that the educational material takes on board the views and perceived needs of the learner and identifies 'needs' which would potentially be missed if a traditional 'teacher knows best' approach was solely used.

Like Carr *et al.* and Glicksman *et al.*, no specific mention of how the questionnaire was developed was given and only one of the additional topics suggested in round one of the Delphi study for operations and complications was included in round two. It appears from the paper that more were added for emergencies but this is not entirely clear.[95]

In this study it would have been of great interest to look at the subgroup responses, particularly with regard to the non-otolaryngology group of participants. Three of the five subgroups of participants (29 of the 51 responses) were otolaryngology focused, and therefore reporting of the overall results may hide important differences in topics identified by medical students and general practitioners. In addition, all respondents were again from the same region and the needs identified may reflect either local deficiencies in teaching, local specialist interests or needs specific to the local environment. Although this may be a desirable feature, particularly when designing local curricula, further work would be required to establish if these needs were similar across the country if a national 'core' were to be established. Comparisons with studies from other areas could potentially resolve this problem.

A risk of defining objectives for such specific areas of the course is that it is possible to lose focus of the wider curriculum. In such cases it can be easy to make objectives overly specific and caution must be exercised when implementing them to ensure that they fit with the overall course objectives. As Harden explains, long lists of learning objectives can become "window dressing" and risk being "unworkable".[103]

Work by Lloyd *et al.* from 2014 attempted to provide evidence for the content of an entire undergraduate otolaryngology curriculum. It involved a two stage Delphi study "To determine an ENT undergraduate syllabus".[43] For this reason, this study is described in more detail.

In this study a 232 item questionnaire was designed by the researchers. Participants were asked to rate these items from 1, "least important" to 5, "most important". The survey was based in Manchester, UK and participants included otolaryngology consultants and registrars, accident and emergency consultants and registrars, general practitioners and paediatric consultants. The greatest proportion of respondents were general practitioners followed by otolaryngologists. The Likert-type scale for round two asked participants to rate items from 1, "not important" to 10, "essential". When the results were collated, a mode of less than seven was used to determine which topics were not included in the undergraduate curriculum.

Results showed that objectives relating to history taking, examinations skills, red flags and "common ENT conditions" ranked most highly. One hundred and seventy seven learning objectives met their criteria for inclusion in the undergraduate curriculum. This comprehensive study provides a range of potential learning objectives which can be tailored to suit the length of otolaryngology attachment within individual schools by altering the mode at which the cut-off for inclusion is set.

A large number of the participants in the study by Lloyd *et al.* were from non-otolaryngology specialties and this is important as it ensures that the views and needs of a wider range of doctors were taken into consideration when proposing objectives. Given the large number of students who enter general practice, the large proportion of general practitioners participating was a particular strength of this study. In common with the Delphi study by Doshi *et al.*, subgroup analysis would have been useful.[95] This would have allowed readers to see if any one group, for example otolaryngologists, had skewed the results towards more specialist topics compared with non-otolaryngology groups. This would clearly have implications for who to involve in the curriculum design process.

The study also simply asks respondents to rate the importance of a topic or pre-formed learning objective. At no point was it stated that participants were able to provide additional topics or comments and therefore the responses only reflect the opinions of participants on topics selected by the study authors. Where topics such as clinical conditions are listed, rating the level of importance does not guide the curriculum developer, teacher or student as to what the expected performance level should be. For example, should one simply know a condition exists or be expected to manage it through to its conclusion? What element of an "essential" topic is essential?

The authors themselves note that one of the main limitations of the study was that certain common topics were not included in the survey and suggest that these should simply be added to any curriculum. Examples of these include gastro-oesophageal reflux and globus pharyngeus. This clearly relates to survey design flaws and this has been seen in previous needs assessment studies in otolaryngology.[60, 86] The authors do not describe how their survey content was developed but oversights such as those acknowledged by the authors have the potential to have a significant impact on the results of the study.

As with many previous studies, the participants in this group were all from one geographical area, with the exception being the otolaryngology group who were contacted via a national mailing list. One solution to the local focus of the majority of the needs assessments would be to combine the results from multiple studies and observe any emerging trends but this would prove problematic due to the lack of standardisation in survey design.

Summary

This literature review shows that there is an overwhelming perception that there is a lack of otolaryngology in the undergraduate curriculum. Evidence showing the effect of this on patient care and careers however is difficult to find due to the multifactorial nature of these outcomes. The evidence which is available comes from surveys which showed that accident and emergency senior house officers (SHO) and general practitioners felt that their undergraduate otolaryngology training was inadequate.[82, 83] The rest of the evidence is anecdotal.

Curriculum evaluation to date has focused on assessing the volume of otolaryngology in a curriculum rather than outcomes. More recently a number of papers have attempted to define learning achievements in otolaryngology in terms of the importance of topics. Surveys and Delphi techniques have been used.[43, 60, 97] It is of interest that all papers were written by otolaryngology specialists. It is of course natural for specialists to take an interest in their own area but without careful study design there is a risk of introducing bias toward a specialist's view point.

It was acknowledged in 1964 in correspondence received in response to a survey that "Students should be attached to a general practitioner and see their problems first-hand".[96(p.32)] The author further quoted responses including:

> I think that it is quite impossible for the proper emphasis to be given to the prospective general practitioner by a hospital-bound consultant who cannot know what is currently being seen and treated. This problem can only be got round by an ENT-minded general practitioner giving these particular lectures.[96(p.33)]

Despite this, few papers consider the views of general practitioners. Only one Canadian medical school utilised non-otolaryngology doctors in their otolaryngology teaching programme.[85] No further mention of this approach is made and no paper proposes integrating otolaryngology topics throughout the undergraduate curriculum rather than confining them to any formal otolaryngology education received.

Several authors have suggested that otolaryngology should be better represented in the undergraduate curriculum.[43, 55, 61] Given, however, that curricula are already full to the point of bursting and that for any addition there must be some reduction in another area, compromise is required. It is therefore vital that any proposed changes are made for the right reasons and evidence for inclusion of topics is required.

To consider areas where further work is required the main points are summarised below:

1. There has been no assessment of learning achievements of medical school graduates

Defining what is currently expected of graduates allows comparisons to be made between schools and benchmarking to occur.

2. There is a lack of clarity over how surveys have been devised

This is important as it allows course organisers to ascertain if any bias has been introduced in the survey design process which may influence results.

3. The performance level for students' achievements have not been well defined

Only one study has looked at the level of performance of a student in relation to topics and this simply stated whether an in-depth knowledge was required.[97] Determining the level of performance is important to allow for curriculum and assessment planning.

4. No UK national studies have been conducted in this area

Although data are available from the USA and Canada, no national data is available from the UK. National data is important when designing a national curriculum to ensure that no bias is introduced by local requirements.

5. No subgroup analysis has been undertaken

No study to date has specifically examined differences between groups and locations of respondents. This is important to help determine who should be involved in the curriculum design process.

6. Explanation of results

No studies to date have attempted to understand the reasoning behind curriculum content decisions and to understand differences in responses between subgroups.

Outline of project

The following section provides an overview of the methods used in this mixed methods study. More in depth information regarding individual studies is provided within the relevant chapter.

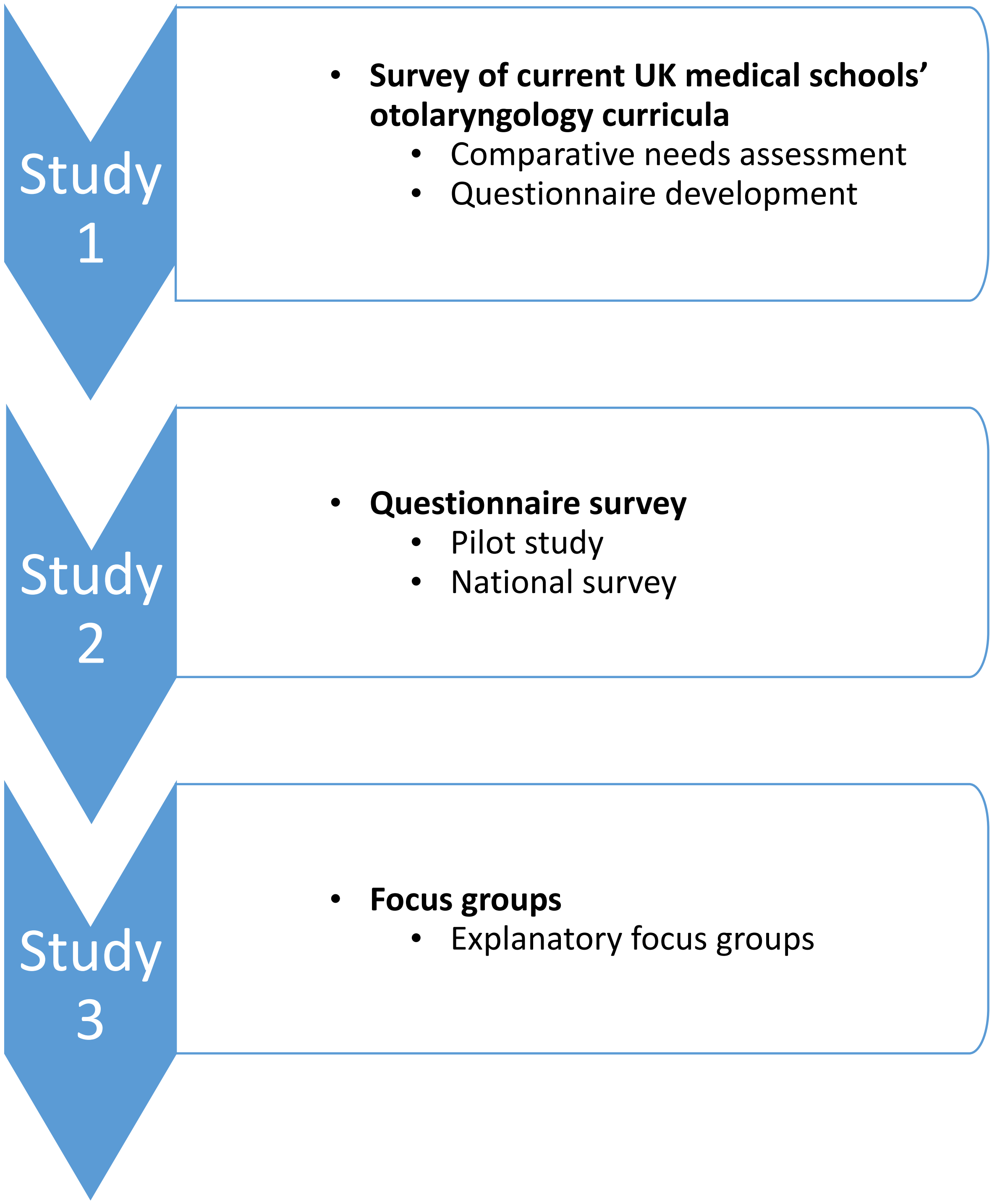

Figure 1: Outline of project

1.	Method:	**Survey of current undergraduate otolaryngology curricula in the UK**
	Objective:	Comparative needs assessment
		Questionnaire development
	Target:	Medical schools in the United Kingdom
	Participants:	Medical schools in the United Kingdom
2.	Method:	**Questionnaire**
		Pilot and national questionnaire survey
		A Likert type scale will be used
	Objective:	To identify components of an otolaryngology curriculum
	Target:	National sampling of doctors
	Participants:	Foundation doctors (years one and two)
		Specialty trainees
		General Practitioners
		Consultants
3.	Method:	**Focus group**
	Objective:	Explore results of questionnaire
	Target:	Doctors of varying grades
	Participants:	Foundation doctors (years one and two)
		Specialty trainees
		General Practitioners
		Consultants

In this study, a longitudinal transformation approach to mixed methods research design was used. This allows each study to inform the next. In addition, quantitative and qualitative studies were used together to gain a better understanding of the results obtained.

The main part of this research consisted of a survey (study two). To ensure that the content of this was relevant and precise, undergraduate otolaryngology curricula from UK medical schools were collected and collated. A basic thematic and content analysis of this data was undertaken and a survey devised. The survey was then discussed amongst an expert group consisting of the dean of a medical school, a medical educationalist and four otolaryngology consultants with an interest in education. Once consensus had been reached a pilot study of the questionnaire was undertaken to ensure accuracy of responses and quality of data. It was anticipated that questions would arise from the completed surveys and therefore, following the survey, focus groups were planned to follow up on points raised.

A national survey was considered essential to ensure that no bias from one region of the country was introduced. A risk of using data from one region alone would be that many respondents may have attended the same medical school leading to their own experiences biasing their response. Targeting one single area may also risk introducing bias by identifying specific local learning needs, not necessarily applicable to the rest of the UK. In addition, whilst compiling data for use in a national curriculum, a single centre study may not have allowed the data to be extrapolated to other centres and may reduce future ‘buy in’ from other medical schools as a result. The aim therefore, was to use a nationally inclusive approach to collect data from a wide range of doctors from a wide range of backgrounds from within the medical community.

In addition, it was felt that if the project was expanded to international the results may not be applicable to the UK population specifically and may not reflect the requirements of UK medical schools. In previous attempts to establish a core curriculum in anatomy, concerns were raised at attempting to do this on an international scale, particularly where consensus methods were being employed.[104, 105]

Study 1: Curriculum comparison in the United Kingdom

Introduction

A curriculum is central to the planning and implementation of teaching and learning. It brings together the objectives, structure and outcomes and provides both teachers and learners with valuable information about the course. The General Medical Council (GMC) define a ‘curriculum’ as:

> A statement of the intended aims and objectives, content, experiences, outcomes and processes of a programme, including a description of the structure and expected methods of learning, teaching, feedback and supervision. The curriculum should set out what knowledge, skills and behaviours the trainee will achieve.[106(p.2)]

A study in 2012 by Khan and Saeed concluded that as curriculum time was limited, it “must be utilised efficiently”.[55] It is therefore important to examine the otolaryngology that is taught in UK medical schools and how it is taught. Examining individual medical schools’ otolaryngology curricula provides a method for doing this.

To our knowledge, no curriculum evaluation tool existed to allow for a comparison of undergraduate specialty curricula. This study aimed to compare undergraduate otolaryngology curricula in the UK with the aid of a Curriculum Evaluation Framework (CEF) devised specifically for this task and based on the GMC’s definition of curriculum. It is noted that the GMC’s curriculum definition relates to postgraduate training. The definition is, however, useful when considering what constitutes a curriculum document in general. This form of comparative needs assessment is useful for establishing areas of consensus and for highlighting differences which may indicate learning gaps in a curriculum.

Methods

Curriculum Evaluation Framework design

The CEF (*Table 6*) was based on the GMC's definition of curriculum.[106] It utilised work on curriculum evaluation frameworks by Leibbrandt *et al.* from 2005.[107] In their study they developed a framework to evaluate undergraduate nursing curricula in Australia as part of an Australian government funded study. Their tool was designed to evaluate a school's overall curriculum. The framework used in this current study was therefore modified to suit the needs of specialty curricula. The CEF also incorporated ideas from Kern's Curriculum Development for Medical Education, particularly with regards to approaches to problem identification and general needs assessment.[1]

Table 6: Specialty specific Curriculum Evaluation Framework (CEF)

Item	Areas examined
1. Curriculum details and structure	Year of publication / updated Organisers and contact details Duration of course Information on course structure Links with other areas
2. Content and methods	Teaching hours Aims and objectives Content Methods
3. Assessment and feedback	Type of assessment/feedback
4. Alignment with General Medical Council	Tomorrow's Doctors framework
5. Other	Anything of interest / exceptional

The GMC's definition of curriculum states that it should include a statement of the "processes of a programme" and description of "expected methods". Item one of the CEF aims to address these areas by examining course structure and organisational details. 'Links with other areas' refers to interaction between otolaryngology, general practice and other specialties or disciplines in which otolaryngology conditions commonly present.

Item two examines content and includes methods of teaching. A thematic analysis was conducted to determine the content element. Common themes, such as 'acute conditions' and 'examination skills', were identified. Further analysis then aimed to identify topics related to these themes, for example otoscopy in examination skills. This involved both thematic and content analysis. The analysis involved a thorough review of the documents followed by a keyword search. Key words were identified from the initial analysis and then expanded to include Medical Subject Headings (MeSH) as well as key words from MeSH tree structures.

Item three focuses on assessment and feedback. Each document was examined to ascertain the method of assessment employed. This includes self-assessment checklists. Item four relates to alignment with the competencies as outlined by the GMC in Tomorrow's Doctors, and allows for a comparison to the overarching outcomes which medical schools must attain.[108] Item five was included to ensure that any additional points of interest not captured by the other items were not missed.

Data collection

The otolaryngology curriculum was requested by email from the 32 UK medical schools who award a primary medical qualification in October 2014. Initial enquiries were directed centrally to medical school administrators and course coordinators. This was done to ensure that the complete otolaryngology curriculum was collected given that the subject may be covered at multiple locations or stages throughout the undergraduate course. Follow-up emails were sent when required. Analysis of each curriculum was undertaken by a single researcher (RS) using the CEF. Data were recorded in Microsoft Excel and results reported in a random manner to ensure that individual medical schools were not identifiable.[109] The University of Dundee ethics committee was consulted and no specific ethical issues were deemed to exist for this study.

Results

Otolaryngology curricula were received from 19 of the 32 UK medical schools (59%). It was possible to ascertain when a curriculum document had been written or updated for nine schools. Six were written within the previous year, two within the previous five years and one more than five years ago. Documents ranged from a single page list of objectives through to in-depth study guides. In some medical schools where students visited otolaryngology more than once, the curriculum documents were split to deal specifically with the student's stage of training.

The curriculum documents provided information on the duration of otolaryngology teaching for ten schools. Five schools had two or more weeks of otolaryngology teaching, three had between one and two weeks and two schools had less than one week of otolaryngology teaching. It was not possible to work out the individual hours of teaching for each medical school from the documents. Five schools did however direct students to a separate document or a timetable.

Course information was contained in seven of the nineteen curriculum documents. Nine contained details of a contact person or course organiser. Nine included information linking otolaryngology to other areas in the medical school curriculum and four linked their curriculum to the GMC's Tomorrow's Doctors' outcomes.[108]

Aims, objectives or outcomes were listed in 18 of the 19 schools' curriculum documents. All medical schools who replied included an otolaryngological 'clinical condition' in their curriculum (*Figure 2*). The majority also included acute conditions and examination skills. Procedural skills and psychosocial aspects were mentioned less often (by 12 and 7 schools respectively).

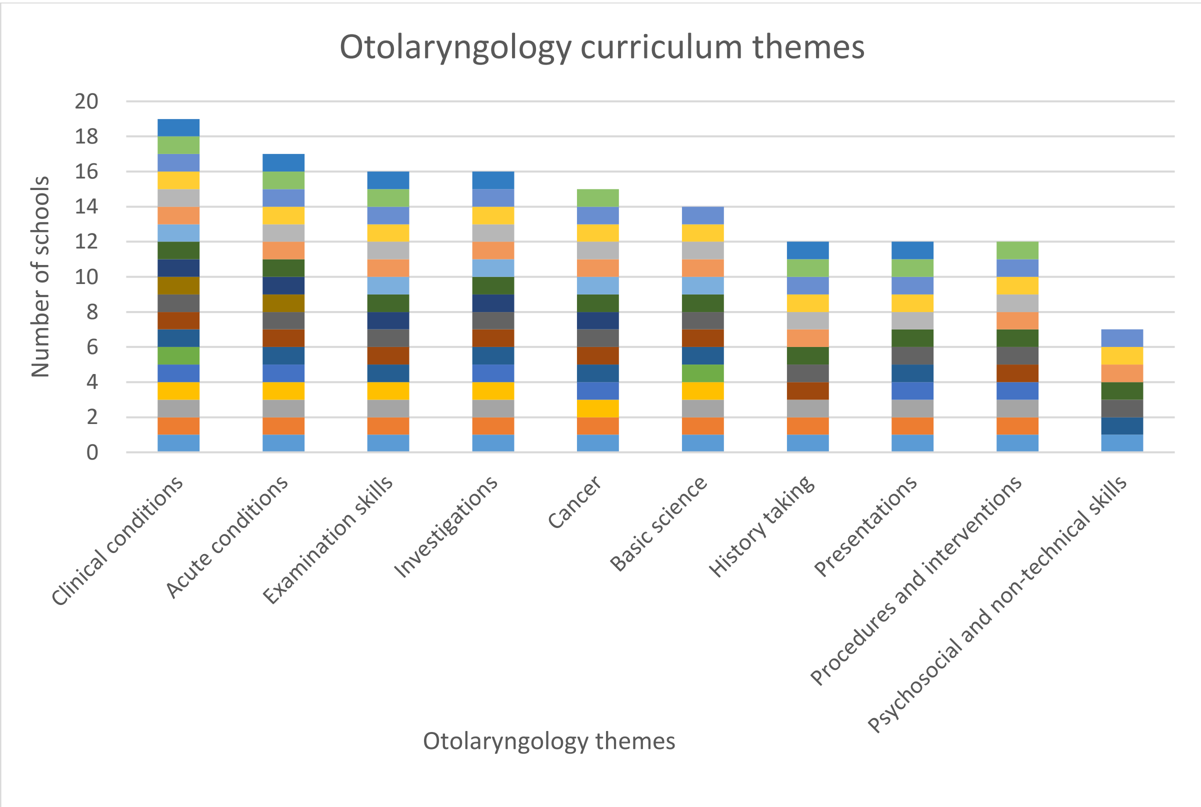

Figure 2: Curriculum themes as identified by thematic analysis.

Each colour is representative of an individual medical school.

Examination skills were covered by 16 schools in total. *Table 7* shows the variability in which skills were covered in each curriculum. Otoscopy was the most commonly covered skill with specialist tests such as Dix-Hallpike, Romberg's and Unterberger's tests mentioned in only a small number of otolaryngology curricula.

Table 7: Examination skill theme showing individual topics

Examination skills	Number of medical schools	Percentage (%)
Otoscopy	14	74%
Nasal cavity	12	63%
Neck	12	63%
Throat	11	58%
Tuning fork tests	11	58%
Oral cavity	10	53%
Larynx	4	21%
Salivary glands	4	21%
Dix-Hallpike test	4	21%
Test of hearing	4	21%
Romberg's test	2	11%
Unterberger's test	1	5%

Examining the acute conditions theme in more detail revealed that there was a degree of variability regarding which conditions were covered in the curriculum document (*Table 8*). Epistaxis was the most commonly mentioned. Orbital cellulitis was the least commonly covered and was mentioned in only one curriculum document.

Table 8: Acute condition theme showing individual topics

Acute condition	Number of medical schools	Percentage (%)
Epistaxis	15	79%
Upper airway obstruction	12	63%
Acute vertigo	12	63%
Tonsillitis	11	58%
Nasal trauma	10	53%
Quinsy	7	37%
Foreign body	6	32%
Pinna haematoma	4	21%
Orbital cellulitis	1	5%

Variability in curricula can again be seen when examining rhinology conditions (*Table 9*). Acute and chronic rhinosinusitis were the most commonly covered rhinology topics.

Table 9: Rhinology theme showing individual topics

Rhinology	**Number of medical schools**	**Percentage (%)**
Chronic rhinosinusitis	16	84%
Acute rhinosinusitis	14	74%
Facial pain	11	58%
Allergic rhinitis	10	53%
Non-allergic rhinitis	10	53%
Septal deviation	7	37%

Chronic otitis media was mentioned in the majority of curricula *(Table 10*). There was however a large number of otology specific conditions which were mentioned in only one or two curricula.

Table 10: Otology theme showing individual topics

Otology	Number of medical schools	Percentage (%)
Chronic otitis media	15	79%
Facial nerve palsy	12	63%
Acute otitis media	12	63%
Otitis externa	12	63%
Chronic otitis media with effusion	11	58%
Tinnitus	11	58%
Sensorineural hearing loss	10	53%
Vestibular schwanomma	9	47%
Conductive hearing loss	8	42%
Meniere's disease	8	42%
Mastoiditis	8	42%
Otosclerosis	7	37%
Complications of middle ear disease	7	37%
Tympanic membrane perforation	7	37%
Noise induced hearing loss	6	32%
Presbyacusis	5	26%
Vestibular neuritis	5	26%
BPPV	4	21%
Ototoxicity	3	16%
Eustachian Tube Dysfunction	3	16%
Tympanosclerosis	3	16%
Congenital hearing loss	2	11%
Vestibular migraine	2	11%
Auditory processing disorder	1	5%
Presbyastasis	1	5%
Aural polyps / granulations	1	5%
Barotrauma	1	5%
Chondrodermatis nodularis helicis	1	5%

A number of other otolaryngological topics were mentioned in the curriculum documents. It can be seen from *Table 11* that there were a large number of topics mentioned in relatively few medical schools' curricula.

Table 11: Other otolaryngological topics theme showing individual topics

Other otolaryngological conditions	Number of medical schools	Percentage (%)
Obstructive sleep apnoea	8	42%
Salivary gland disorders	7	37%
Thyroid disorders	7	37%
Benign vocal cord lesions	6	32%
Vocal cord palsy	5	26%
Branchial cyst	5	26%
Thyroglossal duct cyst	5	26%
Pharyngeal pouch	4	21%
Globus pharyngeus	4	21%
Laryngo- pharyngeal reflux	4	21%
Laryngitis	4	21%
Epiglottitis	4	21%
Laryngeal papillomatosis	3	16%
Muscle tension dysphonia	3	16%
Pharyngitis	3	16%
Croup	3	16%
Laryngomalacia	2	11%

A number of investigations were mentioned in the curriculum documents (*Table 12*). Audiological tests were the most commonly covered.

Table 12: Investigations theme showing individual topics

Investigations	Number of medical schools	Percentage (%)
Audiometry	13	68%
Tympanometry	9	47%
Vestibular function testing	5	26%
Allergy testing	3	16%
Throat swabs	3	16%
Neonatal hearing screening	2	11%
Glandular fever tests	2	11%

The most commonly mentioned procedural skill was tracheostomy (*Table 13*). A wide range of procedures were mentioned in curricula and medical school curricula varied on whether students should have observed the procedure or simply know about them.

Table 13: Procedures theme showing individual topics

Procedures	Number of medical schools	Percentage (%)
Tracheostomy	10	53%
Nasendoscopy	7	37%
Functional Endoscopic Sinus Surgery	6	32%
Fine needle aspiration	6	32%
Grommet insertion	5	26%
Tonsillectomy	5	26%
Mastoid surgery	4	21%
Septoplasty	4	21%
Cricothyroidotomy	3	16%
Indirect laryngoscopy	3	16%
Nasal packing	3	16%
Videostroboscopy	2	11%
Nasal cautery	2	11%

Psychosocial aspects were mentioned in only seven otolaryngology curricula (*Table 14*). Communication with the hearing impaired was however covered by all seven of those schools. Behavioural and psychological factors affecting otolaryngology diseases and the social implications of vertigo were covered by three and two schools respectively.

Table 14: Psychosocial/ non-technical elements showing individual topics

Psychosocial/ non-technical aspects	Number of medical schools	Percentage (%)
Communication with the hearing impaired	7	37%
MDT approach to deafness	6	32%
MDT in voice management	6	32%
Educational implications of hearing loss	4	21%
Importance of voice in communication	4	21%
Social implications of hearing loss	3	16%
Communication with laryngectomees	3	16%
Behavioural / psychological factors affecting disease	3	16%
Social implication of vertigo	2	11%

A number of head and neck cancer topics were mentioned in curricula. These included head and neck cancers by location, for example, laryngeal, salivary gland and thyroid. This also included head and neck cancer topics such as treatment (e.g. surgery or radiotherapy) and risk factors or 'red flags' of cancer.

Further content analysis was not undertaken for basic science or history taking themes. The basic science theme was not specialty specific and therefore out with the scope of this study and history taking was deemed sufficiently specific for the purposes of this study.

A variety of teaching methods were employed across the schools (*Table 15*). Outpatient clinics and theatre attendance were the most common form. Four schools utilised allied health professions such as speech and language therapists. E-learning was mentioned in three curricula and two specifically allocated students with self-study time.

Table 15: Teaching methods employed by medical schools for ENT teaching

Teaching method	Number of medical schools	Percentage (%)
Outpatient clinics	9	47%
Theatre	9	47%
Lectures	6	32%
Seminars/tutorials	6	32%
Case based discussion	5	26%
Multi-disciplinary settings	4	21%
E-learning material	3	16%
Anatomy	2	11%
Ward teaching/shadowing	2	11%
Clinical skills 'lab' teaching	2	11%
Self-study allocated time	2	11%
None specified	6	32%

Students were assessed using a variety of methods (*Table 16*). The most commonly employed was a logbook. Self-assessment and reflection were each used by one medical school.

Table 16: Type of assessment used

Assessment type	Number of medical schools	Percentage (%)
Checklist/logbook	6	32%
Otolaryngology teaching block MCQ/EMQ assessment	4	21%
End of year assessment	3	16%
Case assignment/report	3	16%
Tutor sign off	3	16%
Self-assessment	1	5%
Reflection	1	5%
None specified	10	53%

Regarding additional items of interest identified through the curriculum evaluation, it was noticeable that several medical schools set out their otolaryngology curriculum in terms of how a condition presents, for example, ‘hearing loss’, ‘dysphagia’ and ‘nasal blockage’. A full list is provided in *Appendix 1*.

One curriculum document also mentioned integrating teaching for ethics and palliative care and one provided specific objectives for interprofessional learning. A number of curriculum documents provided recommended reading lists and one provided information on career planning.

Discussion

This study describes the development of a curriculum evaluation tool and demonstrates how this can be applied to otolaryngology. By linking the CEF to the GMC's definition of curriculum and incorporating work on evaluation tools used in previous studies, the CEF allowed for a structured comparison between curricula. Additionally, it provided a means to develop a survey (study two) by identifying topics for inclusion. The study highlighted the variability which exists around, not only which topics are included in a curriculum, but also the structure and design of undergraduate otolaryngology education in the UK.

The GMC's Outcomes for Graduates document emphasises the ability of a doctor as a practitioner to be able to take a history, examine a patient, communicate clearly and provide care in medical emergencies [2]. The results from this study show all UK otolaryngology curricula covered at least one clinical condition in their curriculum. It is of interest however that only two thirds specifically mentioned history taking. Lloyd *et al.* conducted a Delphi study in which doctors rated otolaryngology history taking as extremely important.[43] Seventeen out of nineteen medical schools included an acute condition and 16 included an examination skill in their otolaryngology curriculum. This is in keeping with GMC guidance and previous studies which have highlighted these as important areas, however, when these areas are examined in more detail, the variability of topics included in curricula becomes more evident.[43, 86, 110]

An example of this variability between curricula is seen in the examination skills theme. Examination skills were covered by most schools but there was a large degree of variability in the skills outlined in individual curricula. Otoscopy was the most commonly mentioned (74%). This is in keeping with the literature which shows that otoscopy is a commonly performed skill where the number of ears examined by a student is important for competence.[111] Oral cavity examination, however, was mentioned in only 10 of the 19 curricula reviewed and neck examination in only 12.

Examining the acute conditions theme, epistaxis and upper airway obstruction were covered by the majority, however tonsillitis was mentioned in only 58% of curricula. Given that tonsillitis is one of the most common otolaryngology conditions encountered this suggests a potential mismatch between what is included in curricula and clinical practice.[112, 113]

The most commonly used teaching methods were outpatient clinics and theatre attendance. A systematic review of otolaryngology education showed clinic teaching to be highly rated as an educational format.[59] Powell *et al.* surveyed newly qualified doctors and found that clinics, lectures and theatre attendance were the most commonly used methods for delivering teaching.[114] The same respondents reported that theatre time was the least useful and formal teaching with patients was the most useful resource. One study, however, has shown that students found otolaryngology theatre attendance to be beneficial.[99] E-learning was noted in only a few of the curricula. Fung suggests that as the learning styles of students change, teaching methods may need to change to become more ‘interactive’ and ‘multimedia’.[75]

A previous study has shown that around one third of graduates had not been assessed in otolaryngology in undergraduate training.[114] In this current study nine schools mentioned assessment within the curriculum document. The most common of which was a checklist or logbook.

Outcomes for Graduates, produced by the GMC, outlines the overarching outcomes which students must meet by the point of graduation.[108] By linking curricula to this document medical schools can ensure that they are covering the breadth expected of medical graduates. Although this relates to a medical school's overall curriculum it can be useful for a specialty curriculum to link to this to aid with a medical school's own mapping, benchmarking and quality assurance processes. Four of the otolaryngology curricula received specifically mention GMC outcomes.

Limitations

Ideally a curriculum review process should be robust, systematic and follow evidenced based principles, similar to those devised by Coleman *et al.*[115] A limitation of using the curriculum document alone for evaluation is that many questions cannot be answered solely from the document; the intended curriculum does not necessarily equate to the curriculum in action.[107] Given the description of a curriculum by the GMC however, the document should be comprehensive enough to establish basic principles.

The analysis was performed by a single researcher. Attempts to minimise any bias included a robust study design and using systematic analysis including two separate methods of document analysis; a manual document review and keyword searching.

It is unclear whether schools who did not supply a curriculum chose not to or whether no otolaryngology curriculum existed. From previous studies it is clear that there are a number of schools that do not have an otolaryngology curriculum.[55, 56]

Conclusions

Otolaryngology forms an important part of the undergraduate medical curriculum. This study, evaluating otolaryngology curricula, has highlighted the variability in teaching from both a content and methods perspective in the UK.

The evaluation of the curricula provides those involved in curriculum planning with an overview of the main themes currently taught in the UK and offers examples of individual topics. It also gives an insight into the way in which otolaryngology is taught in the UK.

The development of a curriculum evaluation framework has allowed for a systematic comparison of curricula. The framework has proved useful in providing a structure for comparing otolaryngology curricula and, being based on the GMC's definition of curriculum, could be used by other specialties to aid those involved in developing a specialty curriculum.

The curriculum evaluation has also provided an extensive list of topics. These will be taken forward to help develop a questionnaire to attempt to establish what doctors feel a medical student should know about otolaryngology by the point of graduation.

Study 2: National survey

Introduction

Study one highlighted the variability which exists in undergraduate otolaryngology education in the UK. Study two aims to utilise this data to study what practicing doctors feel medical students should learn about otolaryngology.

As outlined above, specialty curricula are often created by an individual or small group of individuals with an interest in education. They may evolve as they pass from one teaching lead to the next or may simply continue from one year to the next without much change. Evidence for this can be seen in early publications relating to otolaryngology education.[40] Alberti and Dawes describe the change to the undergraduate otolaryngology course at the University of Newcastle upon Tyne in the 1960s.[40] The terminology used in their paper often refers to how they "feel" the course should be delivered. Examples include:

> We feel that a good formal introduction to the subject is important…

And

> …need for E.N.T. to be represented in the final examination, a point
> with which we entirely agree.[(p.729)]

This illustrates that curriculum development was often based on an individual's opinion. More recently, attempts have been made to provide evidence for otolaryngology curricula, for example, by highlighting important intended learning achievements.[43]

Despite this, no study has attempted to define the level of the intended achievement to which a student should be competent at by the point of graduation from medical school. Defining this level is particularly important for the curriculum planning process and when setting standards in assessment.[1] By exploring the level of competence required in more detail we can build on previously produced lists of topics. This will ensure that students are equipped with the essential knowledge, skills and attitudes required by the time of their graduation. It will also ensure that assessment accurately reflects the intended achievements deemed important by practicing doctors and specifically will ensure that graduates are equipped for practice.[18]

Bloom's taxonomy describes levels of performance in the cognitive domain. These range from knowledge acquisition through to synthesis and evaluation of knowledge.[90] Miller suggests a pyramid of competency progression from knowledge through to action.[116] Carraccio *et al.* proffer a step-wise process for curricular design which involves 4 stages[18]:

1. Competency identification
2. Determination of competency evaluation and performance levels
3. Competency evaluation
4. Overall assessment of the process.

Carraccio *et al.* note that despite this, many studies to date have focussed on the first step of the curriculum design process; identifying a competency.[18] Study two aims to take this forward and identify the performance levels for medical students in otolaryngology.

There are of course positives and negatives in providing more detailed learning achievements. On the one hand, it can be argued that such an approach limits diversity and that teachers and learners feel disempowered by the constraints of such an approach.[117, 118] On the other hand, stating the intended achievements enables teachers and organisers to clearly set out what they hope to achieve and to plan resources accordingly. This also allows learners to have a clear appreciation of the intended achievements.[1] Defining nationally applicable learning achievements is likely to take on a greater degree of significance within the UK with the proposal from the General Medical Council of the introduction of a national licensing assessment for all UK medical graduates.[119]

Studies from the UK aiming to develop undergraduate curricular content have, to date, been limited in number and those which do exist often only collect data from a small region of the country or data from doctors from a small number of specialties or a limited range of grades.[43, 95] No data exists as to whether or not this localised and somewhat limited data is reliable out with the sampled population. For any such data to be deemed reliable on a national scale evidence should be available. Studies must therefore sample a wide geographical region, a wide range of specialities and a wide range of grades to ensure that key stakeholders input into curriculum design are considered. This study aims to do this.

Methods

Survey design

This section on survey design aims to give a brief overview of the rationale for the design process related to this study. This is based on the outline of considerations published by the National Institute for Health Research (NIHR).[120]

A survey method was chosen as it provides a cost effective way of obtaining a representative sample of opinion from a wide geographical area.[121] Although the survey method can be restrictive in explaining the reasoning behind responses, the additional use of focus groups (study three) was felt to negate this disadvantage. A cross-sectional approach was taken. This allowed for the collection of views from doctors from one point in time. A longitudinal design was not deemed necessary as trends were not a primary consideration. It is anticipated that repeating similar work in the future will be important to ensure that the content of a curriculum is kept up-to-date.

An online questionnaire was thought to represent the most efficient way of collecting the desired data.[122] Face to face, postal and telephone interview methods were considered but due to the anticipated volume of data these were deemed inappropriate. Data collection was undertaken using an online survey tool. This had the advantage of allowing efficient distribution and enabled a practical method for collation of results. Bristol Online Survey (BOS) software was chosen as it provided flexibility in design, was supported by a dedicated team within the affiliated institution (University of Dundee) and allowed for a large number of responses.[123] Given the geographic spread of participants and volume of data, a self-completion approach was taken to the questionnaire as opposed to an interviewer administered approach. Given the participant demographic, no specific issues around literacy were deemed to exist.

A convenience sampling technique was used for the pilot study as the aims of this were along a qualitative line of enquiry.[120] The full survey utilised a cluster sampling technique based on geographical area. Cluster sampling is a commonly used technique in national surveys when it is infeasible to sample from throughout the country.[120]

Survey development

Participants' demographics were collected. This information included the current job of the participant in terms of:

1. Foundation Doctor
2. Core/ Specialty/ GP trainee
3. Consultant
4. General Practitioner
5. Specialty and Associate Specialist (SAS) grade doctor

This data was deemed important to allow for comparisons between groups. Work by Spivey has shown that the grade of doctor has an effect on their response.[124] This was therefore deemed a key area for analysis as differences between groups may affect decisions regarding who should be involved in future curriculum development processes.

Consultants and trainees participating in the survey were asked to specify their specialty to allow for analysis to establish if specialty had an effect on a participant's opinion. Non-otolaryngology doctors were asked if they had previously held an otolaryngology post both to facilitate future comparisons and also to ensure that the sample contained a representative group. For the same reasons it was deemed important to establish whether respondents held an education post and whether they held or were working towards an education qualification.

The region in which the participant currently worked was also requested. The outcome of subgroup analysis for this data would have a direct impact on the design of the subsequent focus groups. Finally, participants were provided with a free text box for any additional comments.

Survey development followed the principles of defining the content material for inclusion in the survey, followed by refinement of the terminology to be used as outlined by Spivey.[124] The content was defined utilising three inputs to ensure a robust approach and to maximise the breadth of topics. These comprised of:

1. Results from the UK curriculum comparison (study one)
2. A literature review for published otolaryngology 'intended achievements'
3. Input from an expert group

The themes identified in study one were used to establish sub-sections for the survey. The topics identified in study one were then listed under each theme.

The literature review looked for any additional topics not included in the curricula determined by study one. The review focused on studies which listed intended achievements including aims, objectives, outcomes or competencies.

The list of topics was then reviewed by an expert panel and additional topics were added. The expert panel consisted of four otolaryngologists, a senior lecturer in medical education and a medical school dean. *Figure 3* shows the number of topics from each source. Following this, criteria were defined to refine the number of topics to be included in the questionnaire. These were:

1. Topics which overlap with other areas of the curriculum and are therefore more likely to be covered by another specialty. An example of this included cranial nerve examination which would be included in neurology teaching.

2. Topics which were deemed more likely to fulfil a place on a postgraduate curriculum were also removed. Examples included performance of certain surgical skills.

3. Topics which were either generic or already stipulated as a requirement by the GMC. As the GMC already stipulate that the topics are required in a medical school's overall curriculum, inclusion of questions relating to these areas was deemed unnecessary. It could be argued that it would have provided an interesting comparator for debate if responses had differed from the GMC's guidelines, however this was not an intended outcome for this study.

4. Amalgamation of topics to help streamline the questionnaire. An example of this was 'paediatric upper airway obstruction' and 'adult upper airway obstruction' became 'upper airway obstruction'.

Throughout the process the terminology was refined to ensure that the most up to date and clinically relevant terms were used. The expert group were invaluable in this process. Where any doubt arose over whether a term would be recognisable to the majority of participants, an alternative was identified or a brief description included. If no suitable alternative could be used but the term was widely used in current undergraduate otolaryngology curricula from around the UK, it remained in the survey following discussion within the group. The intention was to look specifically at these areas within the pilot study to ensure acceptability prior to the full survey.

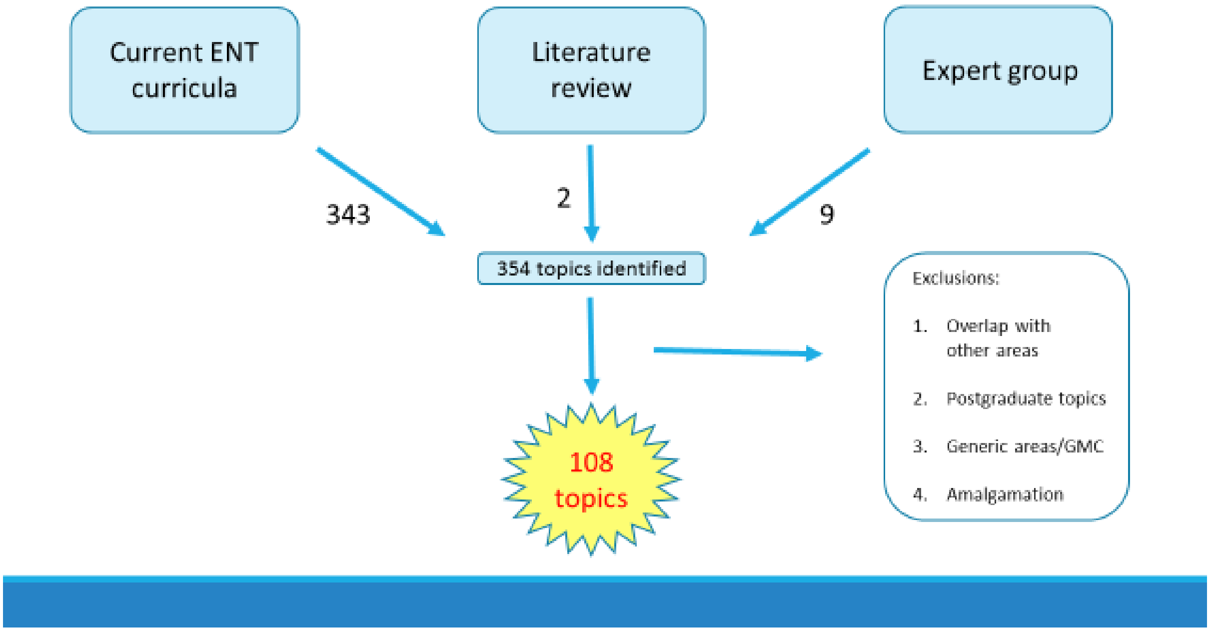

Figure 3: Topic identification for inclusion in questionnaire

It is widely documented that the response rates for surveys of doctors are generally low.[125] There are a number of methods which have been shown to improve response rates. Studies have shown that an incentive leads to an improvement.[126-128] For this reason, it was decided that the use of an incentive would be appropriate for this study both in terms of an incentive for participation but also as a thank you for those responding. Monetary incentives have been shown to be more effective than non-monetary incentives and therefore Amazon.co.uk gift vouchers were chosen for this study.[129-132] A 'prize draw' to identify four participants was held following completion of the study. To maintain anonymity, a link contained on the closing page of the survey directed participants to a separate webpage which could not be linked to individual responses. The draw was undertaken by an independent individual and those selected were contacted by email.

In this study the use of a 'sponsor' was deemed advisable for a number of reasons. Firstly, work on curricula had been undertaken by the organisation who were approached (ENTUK). A subgroup committee of ENTUK (a professional body for those working in otolaryngology) had previously been set-up, unconnected to this work, to deal with undergraduate otolaryngology education in the United Kingdom (ENTUK undergraduate curriculum development team). This group contained valuable resources in terms of experience and personnel. It also provided an excellent conduit for discussion and dissemination of results. Previous studies have also shown that in addition to the primary benefits, response rates are improved by the inclusion of a sponsor. Sudman discusses the effect of a sponsor on a questionnaire survey and concludes that it may be beneficial based on three previous studies.[133-135]

During questionnaire development survey length was a significant consideration. The salience of a survey, how relevant or interesting it is to a potential participant, is closely linked with survey length when considering response rates.[133] If a survey is deemed relevant and of interest, then length may be less of a critical factor.[126] The length of this survey and the possibility that this may affect the response rate was noted but deemed necessary to capture the data required. Efforts to streamline the survey were taken during the initial survey design.

Pilot study

A pilot study was undertaken prior to the full survey. This was designed as an external pilot study and did not aim to collect any data from participants who would be included in the final study. It allowed pre-testing of the questionnaire uninhibited by the constraints of possible changes to the survey which would have made the data non-comparable to pilot study data.

Objectives for the pilot study were set as follows[136, 137]:

- Testing of the questionnaire
- Ensuring questionnaire validity
- Obtaining information on data quality

Ten participants were selected from the representative population of doctors by means of a targeted, convenience sampling method. A convenience sampling method was used to ensure timely and in-depth feedback. An invitation letter was sent by email (*Appendix 2*). All ten of those approached agreed to participate. Participant information was available on the opening pages of the online survey tool and pre-printed survey feedback forms were distributed to each of the pilot participants (*Appendix 3*). Participation in the survey was taken as consent and this was specified within the participant information prior to starting the survey.

Ethical approval for this study was obtained from the University of Dundee Research Ethics Committee (UREC 15017) which related to both the pilot study and the final national questionnaire.

Pilot study results

Demographics

Table 17: Demographics of pilot study participants

Grade of respondent	Number
General Practitioner	3
Consultant	2
Foundation doctor	2
Specialty Trainee	3

All pilot study participants worked in the East of Scotland deanery at the time of participation. Participants had attended medical schools throughout the United Kingdom and one was an international graduate. In total, eight medical schools were represented amongst the ten respondents. The grade of participant is shown in *Table 17*.

Testing of the questionnaire

Feedback on the use of the online survey tool was generally positive. The Bristol Online Survey software worked well and the survey was felt to be "easy to complete". Generally, participants felt that the survey questions were "worded clearly and easy to understand". Two participants felt that the survey was "long" but one of those participants specifically commented that, as it was of interest, they were "happy" with this length. Overall, the time to complete the survey ranged from 10-30 minutes. One participant took 40 minutes but this included time to provide feedback for the pilot study. The mean time for questionnaire completion was 16.7 minutes (excluding the participant who had included feedback time).

Changes were made to the questionnaire following the pilot study. One broken link to the prize draw entry webpage was corrected. Mandatory and optional fields were adjusted and there was a minor rephrasing of question terminology, including changing ‘instigate’ to ‘initiate’, based on the recommendation of pilot study participants.

The repetitive nature of the introductions to questions were reduced as participants had felt that the questions were “self-explanatory”. An example of this reduction includes:

Original text:

“A number of procedures are encountered in the specialty of ear, nose and throat surgery. The aim of this question is to establish at what level a newly qualified doctor at the point of completion of their undergraduate training should be at with regards to the procedures. Please indicate the level a newly qualified doctor at the point of completion of their undergraduate training should be at with regards to the following procedures:”

Following the pilot study:

“Please indicate the level a newly qualified doctor at the point of completion of their undergraduate training should be at with regards to the following procedures:”

A separate option for foundation year doctors and core/specialty/general practice specialty trainees was created in the question relating to current post. The original response option simply had ‘Trainee’ as an option with a subsequent question to clarify the level of trainee. This had caused confusion with the foundation year doctors who tended to use an incorrect option. This led to difficulty in data analysis which was resolved by the change.

There was also a redesign of questions relating to examination skills. Initially participants were asked to rate the importance of a graduate's ability to perform an examination skill on a Likert-type scale. Feedback received from participants indicated that it was difficult to quantify the level of importance of a skill. The redesign of this question moved the emphasis away from an importance rating to examining the performance level of the graduate for each examination skill, for example, should they simply know about an examination skill or be able to perform it.[116] It was felt that this would provide more meaningful responses and reduce the ambiguity of the question. It also brought the question more in line with the question type used throughout the rest of the questionnaire.

Ensuring questionnaire validity

Validity of the questionnaire was measured with respect to both face and content validity using a structured feedback form which pilot study participants completed whilst undertaking the survey. Face validity was demonstrated by unanimous consensus that the survey was acceptable. All participants felt that the questions were "understandable" and that the options available allowed participants to respond as they would like. Participants commented that the questionnaire was "Well structured. Easy to complete survey" [p7Trainee] and a "Great survey" [p8Cons] and "I like the way the answer boxes are structured to allow for a range of responses" [p8Cons].

Content validity was checked both with the expert group prior to the pilot study and with pilot study participants. All participants agreed that the content of the questionnaire "adequately represents undergraduate 'ear, nose and throat' topics". There were some comments relating to specific clinical terms used in the questionnaire. These related to the examination skills section and included Dix-Hallpike and Unterberger's tests as well as two clinical conditions; presbyastasis and chondrodermatitis nodularis helicis. Their use was subsequently discussed with members of the expert group. It was agreed that as these represent the correct and up-to-date clinical terms that they should remain within the questionnaire. It was felt that the available responses in the survey allowed for respondent uncertainty and that this would manifest in their response. For example, if a condition was unfamiliar to a respondent or a term was not used in their clinical practice, they could indicate that it would not be required in the undergraduate curriculum.

Reliability was not measured as the questionnaire aimed to collate a range of opinions and views to guide the development of agreed learning achievements for undergraduate otolaryngology.

In addition, free text responses received in the pilot study were extremely encouraging for the project as a whole:

> "Considering the amount of ENT encountered in primary care, and the aim that > 50% of FY doctors with enter general practice I think it is important that ENT is covered adequately at an undergraduate level." [sic] [p5GP]

> "A national curriculum is long overdue!" [p8Cons]

Obtaining information on data quality

Overall trends and random sampling of data were used to test data quality. A detailed analysis of the pilot study data was not undertaken. A summary of each subsection of the questionnaire is outlined below.

Otolaryngology clinical topic results

Examination skills

No formal analysis was undertaken as, due to feedback received from the pilot study, the structure of this question was significantly redesigned prior to dissemination of the full questionnaire.

Acute conditions

A trend emerged showing participants indicating that graduating students should be able to recognise, assess and initiate management for both life threatening (e.g. airway obstruction) and common (e.g. epistaxis and tonsillitis) acute otolaryngological conditions. *Figure 5* shows an example of the type of response received for the question relating to tonsillitis.

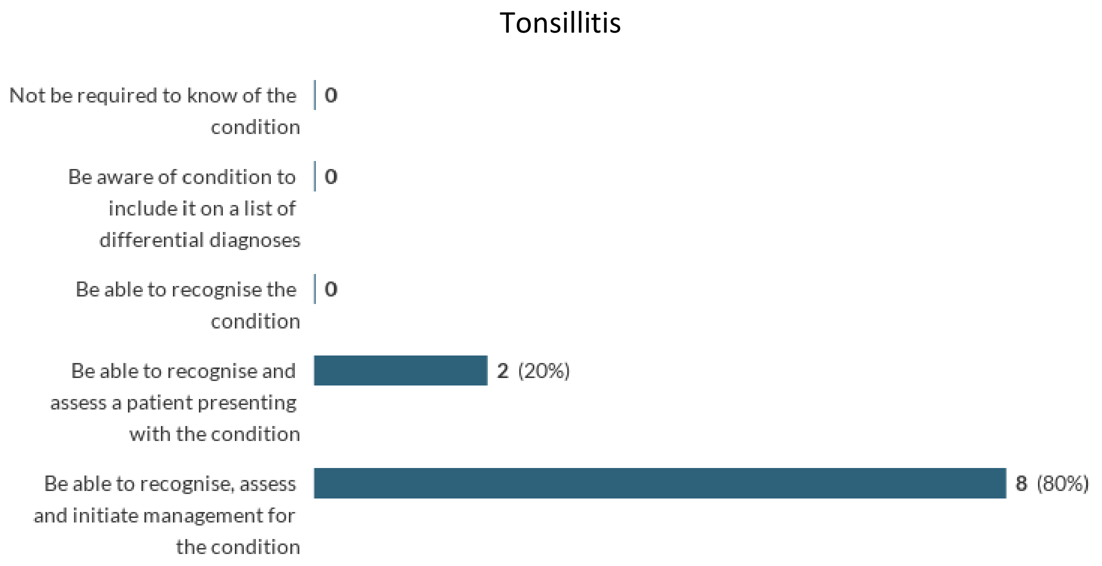

Figure 5: Bar chart showing pilot study data for 'Tonsillitis'

Investigations

Responses to questions relating to investigations in otolaryngology showed a general consensus or grouping of results around a similar skill level. Neonatal hearing screening (*Figure 6*) illustrates the general trend seen in relation to the investigations subsection.

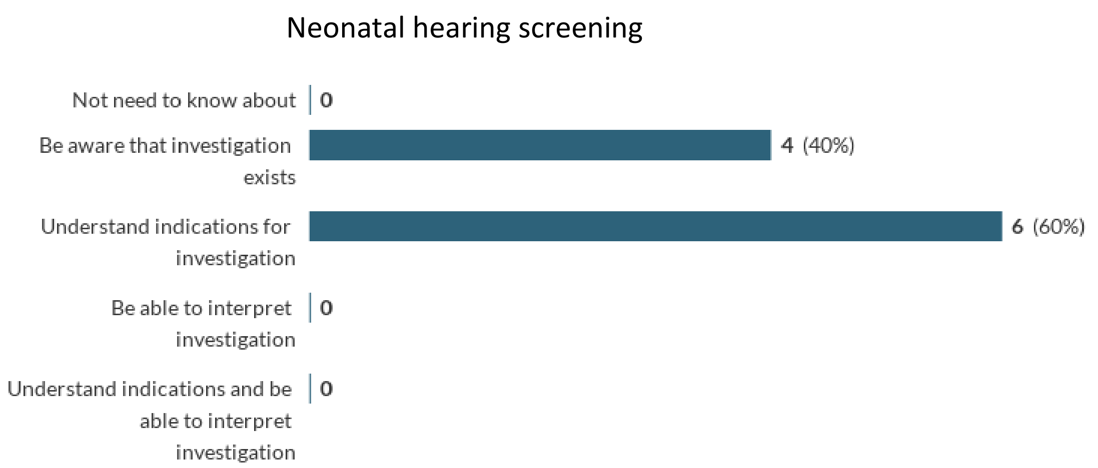

Figure 6: Bar chart showing pilot study data for neonatal hearing screening

Procedures

A trend towards consensus was also noted in questions relating to procedures. Examples are shown in *Figure 7* and *Figure 8* for tonsillectomy and cricothyroidotomy respectively.

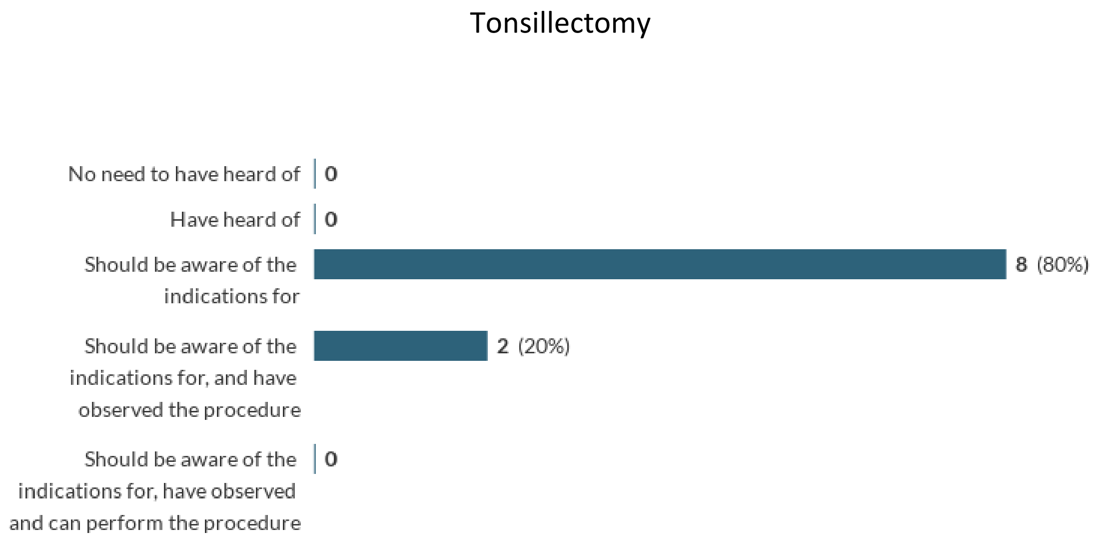

Figure 7: Bar chart showing pilot study data for tonsillectomy

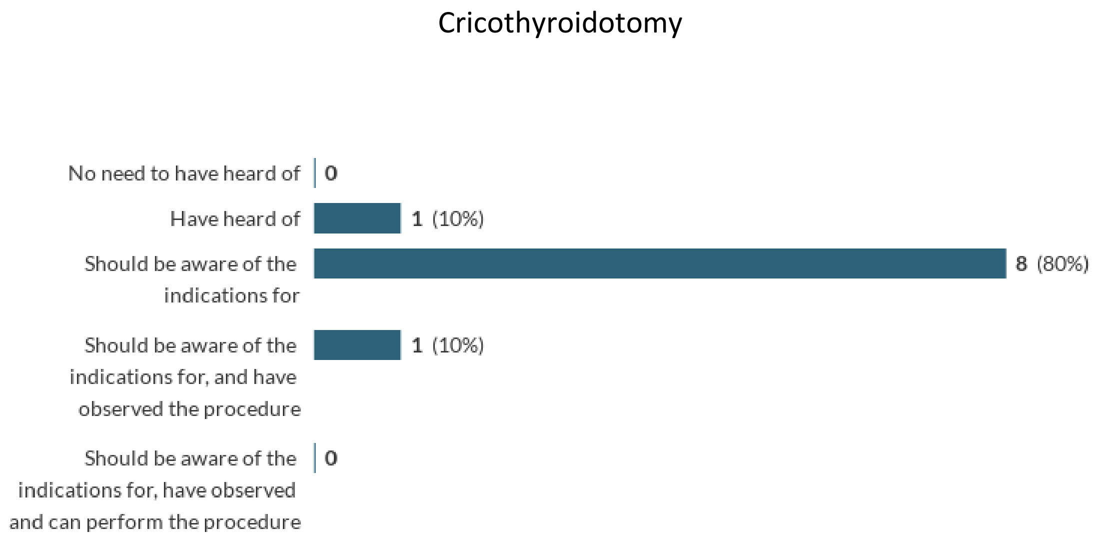

Figure 8: Bar chart showing pilot study data for cricothyroidotomy

Psychosocial / non-technical skills

In questions relating to psychosocial/non-technical skills there was a wider range of responses. *Figure 9* shows responses to the questions relating to "the importance of voice in verbal and non-verbal communication". The range of responses was large with two of the ten participants indicating that this was a topic of 'little importance' whilst two other participants indicated that this was an 'essential topic'. Further subgroup analysis to test the data revealed a slight trend toward general practitioners and foundation year doctors rating the importance higher than specialty trainees and consultants (*Figure 10*). Similar analysis will be carried out for data from the main study to further examine potential variations in subgroups.

The importance of voice in verbal and non-verbal communication

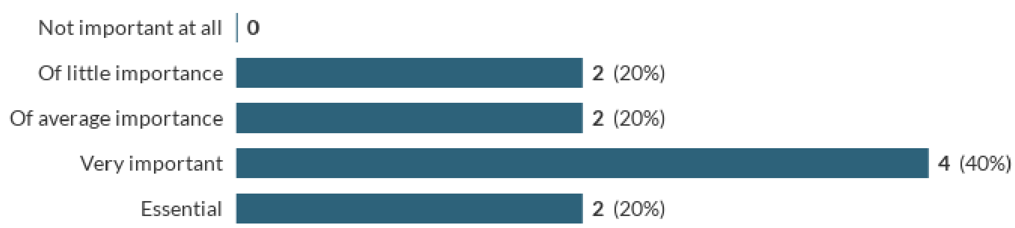

Figure 9: Bar chart showing pilot study data for the importance of voice in verbal and non-verbal communication

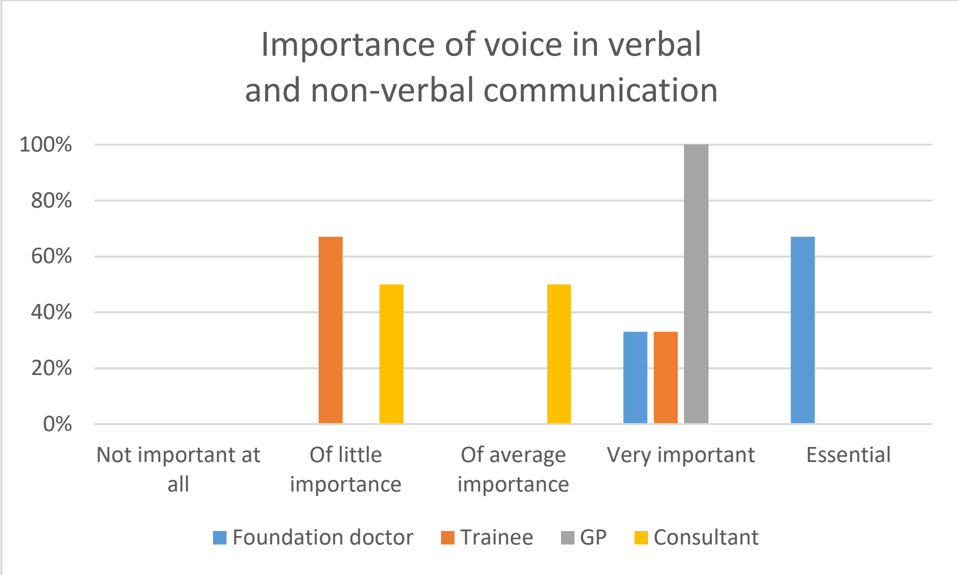

Figure 10: Bar chart showing subgroup analysis for grade of doctor for pilot study data for the importance of voice in verbal and non-verbal communication

Clinical conditions

The clinical conditions subsection contained the largest number of topics. It was therefore subdivided into the following otolaryngology themes; ‘otology’, ‘rhinology’, ‘laryngology’ and ‘other’. For each section there was general agreement in responses for the majority of the questions. Below are some examples from each subsection which are representative of the data received *Figure 11* to *Figure 14*.

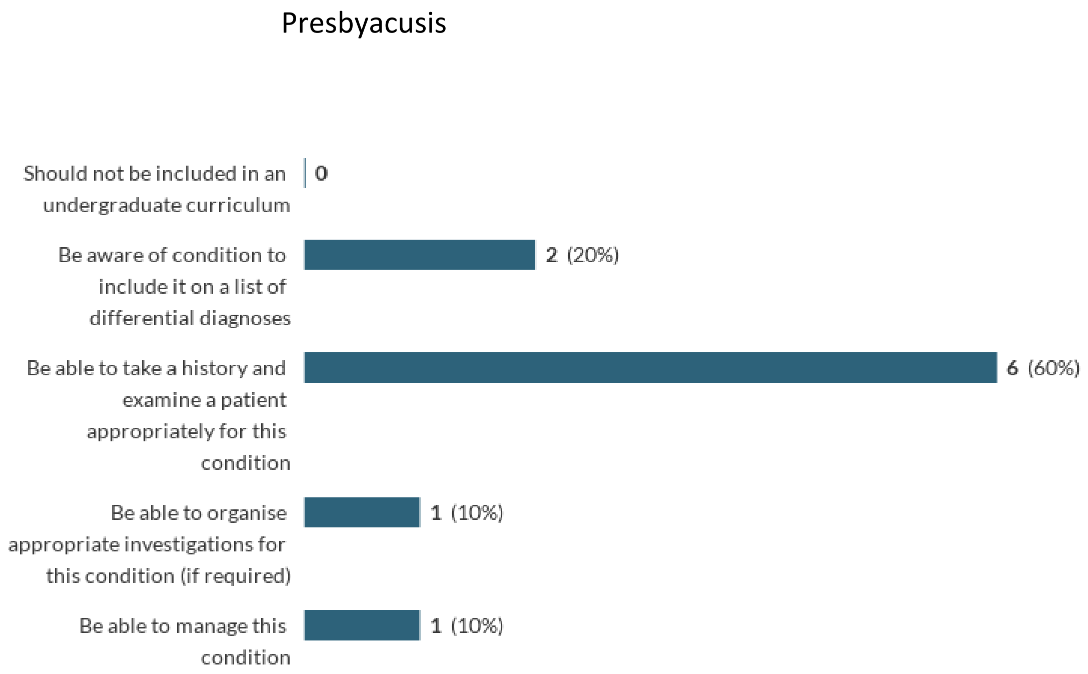

Figure 11: Bar chart showing pilot study data for presbyacusis

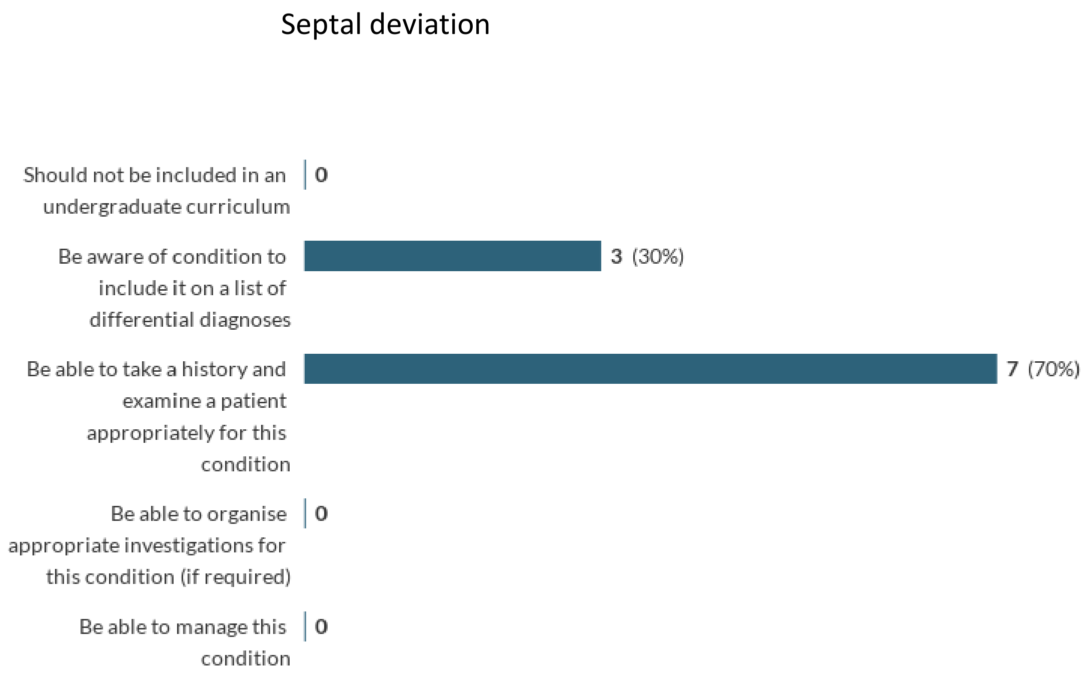

Figure 12: Bar chart showing pilot study data for septal deviation

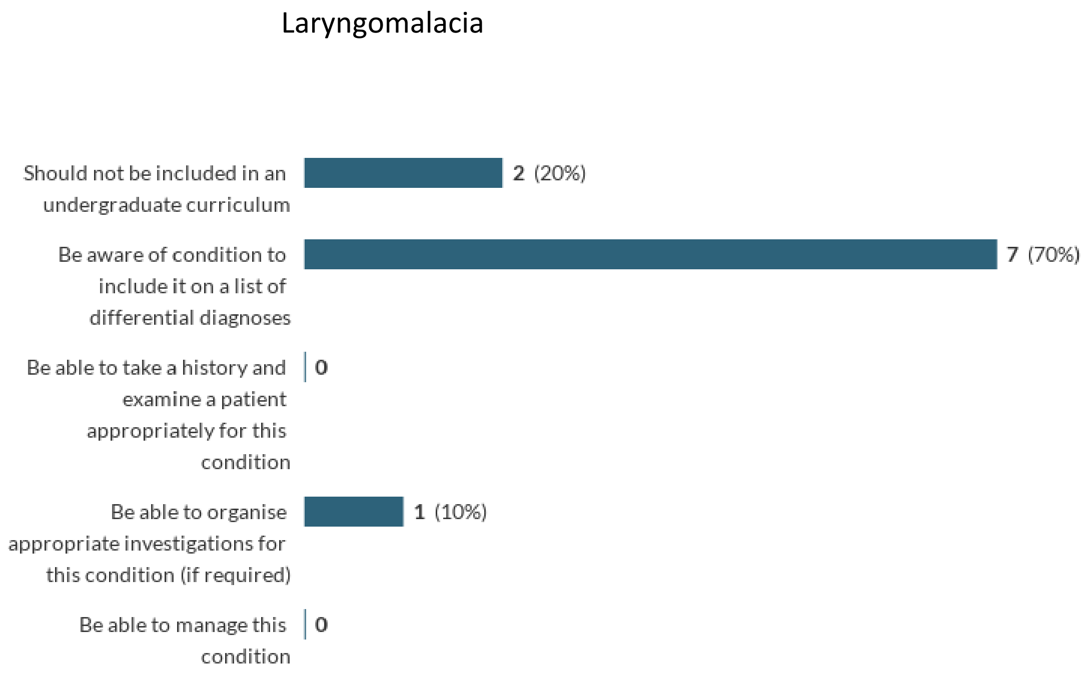

Figure 13: Bar chart showing pilot study data for laryngomalacia

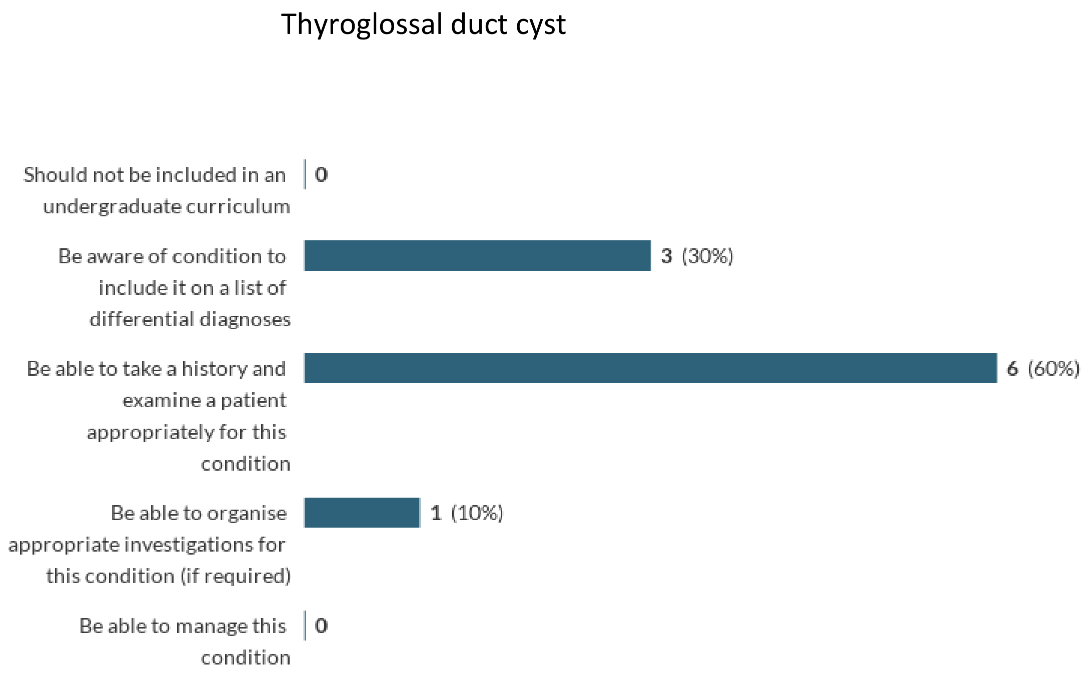

Figure 14: Bar chart showing pilot study data for thyroglossal duct cyst

Head and neck cancer

In keeping with how head and neck cancer topics were presented in current UK otolaryngology curricula (study one), questions relating to head and neck cancer were structured in a different way.

Participant responses related more towards knowledge components of the condition rather than competence. Participants generally indicated that graduating medical students should know about how head and neck cancers present, the aetiology of the cancer and so called 'red flags'; symptoms or signs which alert the student to the possibility of the presence of a malignant condition. *Figure 15* shows a representative example of the responses to questions relating to head and neck cancer.

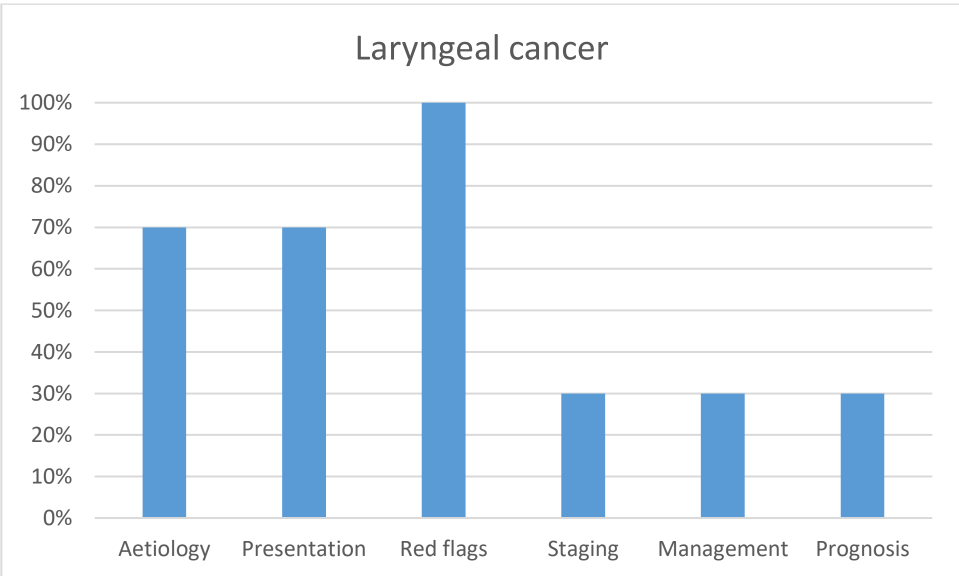

Figure 15: Bar chart showing pilot study data for laryngeal cancer

Conclusions

The aims of the pilot study were met. The pilot study demonstrated that the software for the questionnaire was effective and acceptable to participants. Validity was demonstrated and analysis of the data showed that the information was obtained in a satisfactory manner which allowed for the required analysis to be undertaken.

It was noted that two participants mentioned the length of the survey in their feedback. Although survey length has been shown to be a factor in relation to survey response rates, this must be taken in context of other factors which may also influence response rates.

As the changes to the survey were of a minor nature, no further pilot study was deemed necessary and it was possible to proceed with the full national questionnaire.

Full study

Introduction

Following satisfactory completion of the pilot study, the questionnaire content was finalised. The aim of this stage of the study was to look at the opinions of qualified doctors on what they feel medical students should learn about otolaryngology. Secondary aims were to establish whether the location, grade or speciality of the respondent had an influence on these opinions.

These secondary aims were set for two main reasons. The first reason was that findings from the questionnaire may influence future aspects of the research. For example, if there were significant differences in responses dependent on the location of the participant, subsequent focus groups exploring the perceptions of doctors regarding undergraduate otolaryngology would need to include participants from a wide geographical area. If, however, responses were largely similar despite differences in the location of the respondent, focus groups could be rationalised to one region which would have a significant impact on resource allocation both in terms of time and finances.

The second reason for the secondary aims was that if differences in response existed between locations or the current post of a doctor, there may be implications for future curriculum design processes. This is both in terms of which individuals are involved in the curriculum design process and also in relation to resource implications. For example, sampling large numbers of doctors from different specialties, grades and locations has, in itself, significant resource implications. By analysing the aforementioned subgroups, it may be possible to rationalise further curriculum development projects, both in otolaryngology and in other specialties or situations.

Methods

Questionnaire distribution

The questionnaire was distributed in three geographical regions of the United Kingdom: East of Scotland (Dundee), North West England (Manchester) and London. The overarching aim for distribution remained constant throughout. This was to target four main groups of doctors; Foundation Year (FY) doctors, Specialty Trainee (ST) doctors (including Core Trainee (CT) doctors), General Practitioners (GP) and Consultants. Due to differences in local administrative processes there were small differences in the exact distribution methods used in terms of location and for grade or specialty of doctor. The method of distribution for each group in each area is listed below. Participant reminders were not deemed necessary due to the large and representative response seen following initial communication.

Foundation Year doctors

Information regarding the questionnaire and an invitation to participate were distributed via the Scottish Foundation School, East Region for the East of Scotland foundation trainees. Permission for this was granted by the NHS Education for Scotland Medical Directorate Executive Team. In the North West of England, this information was distributed via foundation trainee email lists to the three Greater Manchester teaching hospitals; Central Manchester University Hospital, Salford Royal Hospital, University Hospital of South Manchester. In London, the invitations to participate were distributed to foundation year doctors in the North East Thames Foundation School.

Specialty Trainee doctors

Information regarding the survey and an invitation to participate were distributed via the East of Scotland Postgraduate Deanery with permission granted by an Associate Postgraduate Dean. In North West England these were distributed via Health Education North West email lists for trainees in Cumbria, Lancashire and Greater Manchester. In London, this information was distributed via email lists for Health Education North West London (surgery) and additionally via inclusion on the General Practitioner Specialty Trainees' 'Synapse' news page online following permission granted from three Heads of School for general practice.

General Practitioners

Information regarding the survey and an invitation to participate were distributed via the East of Scotland general practitioner trainers' mailing list. In North West England a link and information regarding the survey were distributed via the NHS Salford Clinical Commissioning Group (CCG) newsletter. In addition, information regarding the survey and an invitation to participate were sent to a University of Manchester general practitioner email list. In London, this information was distributed via the Tower Hamlets Clinical Commissioning Group (CCG) email list via the general practice Lead for ENT in the Tower Hamlets CCG.

Consultants

Information regarding the survey and an invitation to participate were distributed via the NHS Tayside hospital consultant email list with permission from the NHS Tayside Medical Director. In North West England, information regarding the survey and an invitation to participate were distributed to consultants working at Salford Royal Hospital NHS Foundation Trust with permission from the Hospital Dean. In London, this was distributed via the Barts Health NHS trust consultant email list with permission from the Barts Health Medical Director.

In addition, Information regarding the survey and an invitation to participate was sent to ENTUK and ENT Scotland email lists which enabled distribution to consultants within these societies. Permission for distribution to these societies was obtained from the Chairman of the Undergraduate subcommittee of the Education and Training Committee of ENTUK and the Secretary of ENT Scotland for each society respectively.

The final questionnaire used Bristol Online Survey software.[123] Bristol Online Survey software support was provided by members of the University of Dundee Survey Service Team. The questionnaire consisted of nine main sections:

1. Background information

2. Examination skills

3. Acute conditions

4. Investigations

5. Procedures

6. Psychosocial

7. Clinical conditions

This section was subdivided into:

1. Otology
2. Rhinology
3. Laryngology
4. Other clinical conditions

8. Head and neck cancer

9. Free text comments (optional).

The full questionnaire can be viewed in *Appendix 4*. A screen shot of how the questionnaire appeared to participants can be seen in *Appendix 5*.

Timing of distribution

The online survey remained 'open' for 4 months between the 26th of June and the 15th of October 2015. The timing was chosen to coincide with foundation year doctors' and specialty trainees' end of year, prior to their rotations in August. Mailing lists for these groups were for doctors in post prior to the rotation date to ensure that at least one year at the desired level had been undertaken.

Data collection and analysis

Data was collected using Bristol Online Surveys (BOS) (2016) software.[123] The data was then exported anonymously to Microsoft Excel (2013) utilising the export function within the BOS software.[109] Basic analysis was undertaken using Microsoft Excel and charts created using the same software. A medical statistician was consulted for determining statistical analyses (Dr SA Ogston, Lecturer in Medical Statistics, University of Dundee) and Laerd statistical guides used for presentation.[138] Data was then coded into a compatible format and exported to SPSS (2012) software for more in-depth statistical analysis.[139] The majority of the survey utilised Likert-type scales for data collection purposes.[140] As such, ordinal data was collected and therefore where Likert-type scales were used, the mode was used to represent the average response. Analysis using SPSS utilised statistical tests appropriate to the data. A p value of <0.05 was deemed to indicate a statistically significant result.

Statistical analyses

Kruskal-Wallis H tests were conducted to determine if there were differences between groups dependant on their current post and region of work. The Kruskal-Wallis H test was used as ordinal data was being compared between more than two groups. Boxplots were assessed by visual inspection and if distributions were similar for all groups, comparisons of the medians were undertaken. If, however, the distributions for the groups were not similar, then comparisons of the mean ranks were undertaken. The H test result presented in tables may relate to either. For example, if the distributions are similar, the H test result relates to the median, whereas if the distributions are not similar the H test result relates to the mean ranks.

Where group comparisons revealed a statistically significant difference, post-hoc analysis using pairwise comparisons was undertaken using Dunn's (1964) procedure with a Bonferroni correction for multiple comparisons. This was performed to establish between which groups this statistical difference was occurring. Within the text, adjusted p-values are presented. Given the number of post-hoc analyses required, a summary of significant results is presented in *Table 33*. Due to the different format of questions relating to head and neck cancer topics, subgroup analysis was not undertaken for these topics.

Response rate calculation

Due to the variety of methods required to distribute the questionnaire to the desired cohort there was some difficulty calculating exact response rates. For data protection and confidentially, the email lists were often not shared with the investigator. Distribution relied on a contact person within the obliging organisation. In addition, some distribution lists included duplicate personnel. For example, survey information for general practitioners in the North of England was circulated to both University of Manchester general practitioner contacts and Salford Royal Clinical Commissioning Group contacts to maximise exposure and response. Within these lists there would inevitably be some duplication of invite recipients. For some of the email contact lists, the distributing person was also unable to provide accurate figures on the number of people included on the contact list. Two distribution channels were unable to provide figures and included the North West general practice distribution numbers as this was done via newsletter and the number of contacts on the London general practice email list. An estimation of the figures which are known are therefore provided.

Results

Demographics

An estimated 6496 doctors were contacted and 308 responses were received. The overall response rate was 4.74%.

Table 18 shows the number of responses from participants based on their current post. Although the study was based in three main centres, 10% of responses were from out with these regions and within this group there was a large geographical spread (*Table 19*). Analysis reveals that the most common reason for this was that these responses were from people who had previously been employed in one of the three main regions and were therefore still included on their mailing lists. For the purposes of comparisons of region data only those from within the three main regions were included. Eight-eight percent of those responding indicated that their main location of work was urban with 12% indicating they worked rurally.

Table 18: Number of responses by current post (percentage to nearest 1%)

Participant's current post	Number	Percentage (%)
General Practitioner	61	20%
Consultant	55	18%
Specialty Doctor and Associate Specialist	3	1%
Foundation doctor	76	25%
Specialty Trainee	111	36%
Other	2	1%

Table 19: Number of responses by region

Location of respondent	Number	Percentage (%)
East of Scotland	62	20%
North West England	162	53%
London	53	17%
Other	31	10%

A wide range of specialties were represented for both consultants and trainees. These are outlined in *Table 20* and *Table 21*.

Table 20: Number of responses by consultant specialty

Consultant specialty	Number of respondents
Acute medicine	2
Anaesthetics	3
Emergency medicine	3
Gastroenterology	1
Genito-urinary medicine	1
Haematology	1
Immunology	1
Otolaryngology	32
Oncology	3
Paediatrics	3
Palliative care	1
Pathology	1
Plastic surgery	1
Respiratory medicine	1
Other	1

Table 21: Number of responses by trainee specialty

Trainee specialty	Number of respondents
Acute medicine	3
Anaesthetics	10
Cardiology	2
Core Medical Training	6
Core Surgical Training	1
Dermatology	2
Gastroenterology	1
General Practice	38
General Surgery	1
Geriatric medicine	2
Haematology	1
Immunology	1
Neurosurgery	1
Obstetrics and Gynaecology	4
Ophthalmology	2
Otolaryngology	7
Oncology	2
Paediatrics	7
Pathology	2
Psychiatry	4
Rehabilitation medicine	2
Renal medicine	1
Respiratory medicine	3
Trauma and Orthopaedics	2
Urology	1
Other	2

Of the non-otolaryngology doctors, 17.2% had previously held an otolaryngology post. In the general practitioner group specifically, this was 23.7%. A qualification in education was held by 21.4% and 27.3% currently held an education post. This could either have been a stand-alone post or part of a contract. The majority of universities in the United Kingdom were represented in the survey when examining responses by the university awarding a respondent's primary medical qualification (*Table 22*).

Table 22: Responses by university awarding primary medical qualification

Undergraduate university attended	Number of respondents
Aberdeen	10
Barts and The London	22
Birmingham	11
Brighton and Sussex	0
Bristol	3
Cambridge	8
Cardiff	2
Dundee	23
East Anglia	3
Edinburgh	20
Exeter/ Plymouth	3
Glasgow	9
Hull/ York	2
Imperial	4
Keele	0
King’s	12
Leeds	7
Leicester	6
Liverpool	12
Manchester	57
Newcastle	9
Nottingham	4
Oxford	7
Queen’s, Belfast	6
St. George’s	4
Swansea	0
Sheffield	11
Southampton	4
UCL	10
Warwick	3
Overseas	35
Non-response	1

Only 21% of participants felt that current undergraduate otolaryngology teaching was adequate (*Figure 16*). When subgroups were analysed by participant’s current post, results showed that 64% of foundation year doctors and 53% of specialty trainees disagreed or strongly disagreed that current undergraduate otolaryngology teaching was adequate (*Figure 17*). The consultant group were most likely to ‘neither agree or disagree’. Further analysis of the consultant group revealed that it was the non-otolaryngology consultant group who were most likely to choose this middle option (74%) (*Figure 18*). Post hoc analysis showed statistically significant differences between non-otolaryngology consultants and all other groups: foundation year doctors (*p*=0.003), specialty trainees (*p*=0.013), general practitioners (*p*=0.030) and otolaryngology consultants (*p*=0.036).

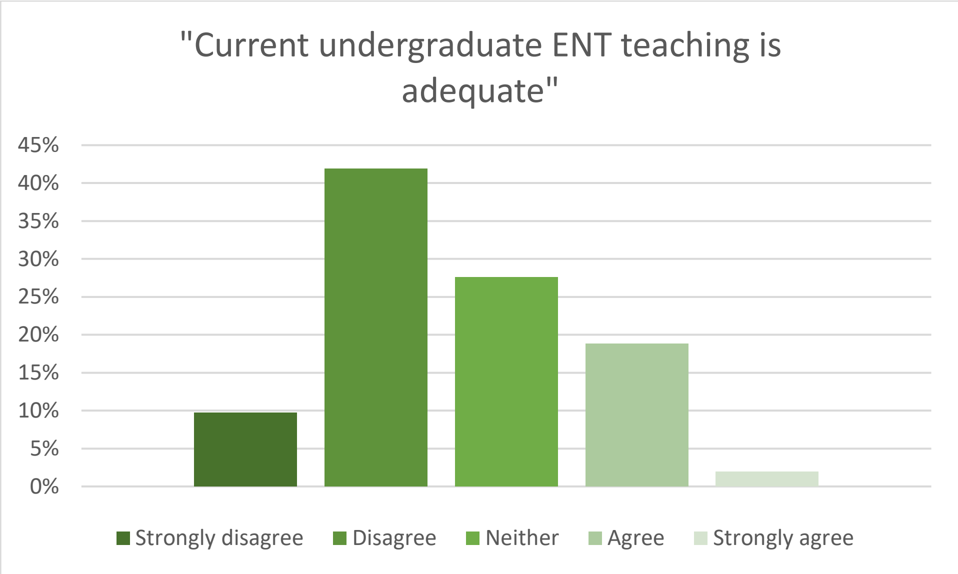

Figure 16: Bar chart showing participant's opinion on the adequacy of current undergraduate otolaryngology teaching.

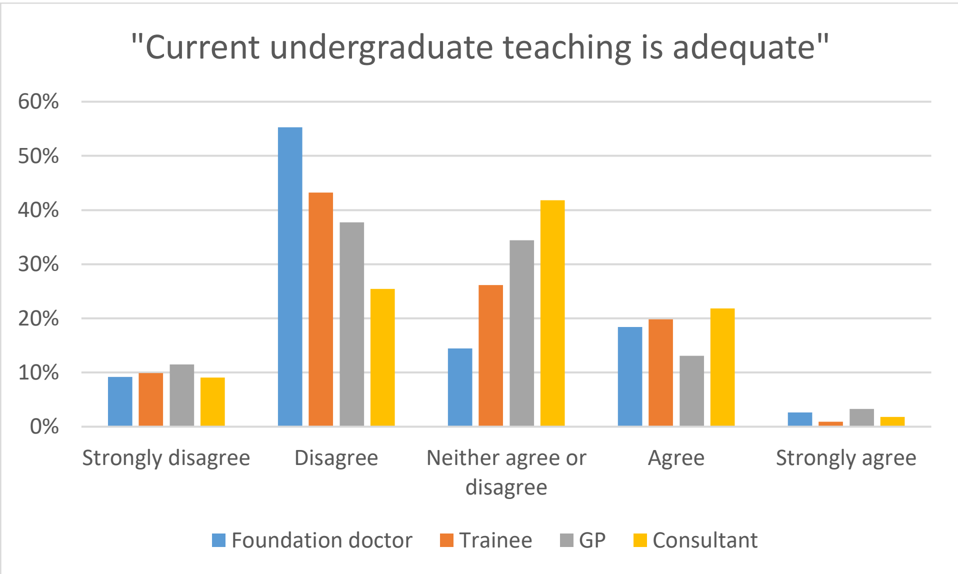

Figure 17: Bar chart showing participant's opinion on the adequacy of current undergraduate otolaryngology teaching split by participant's current post.

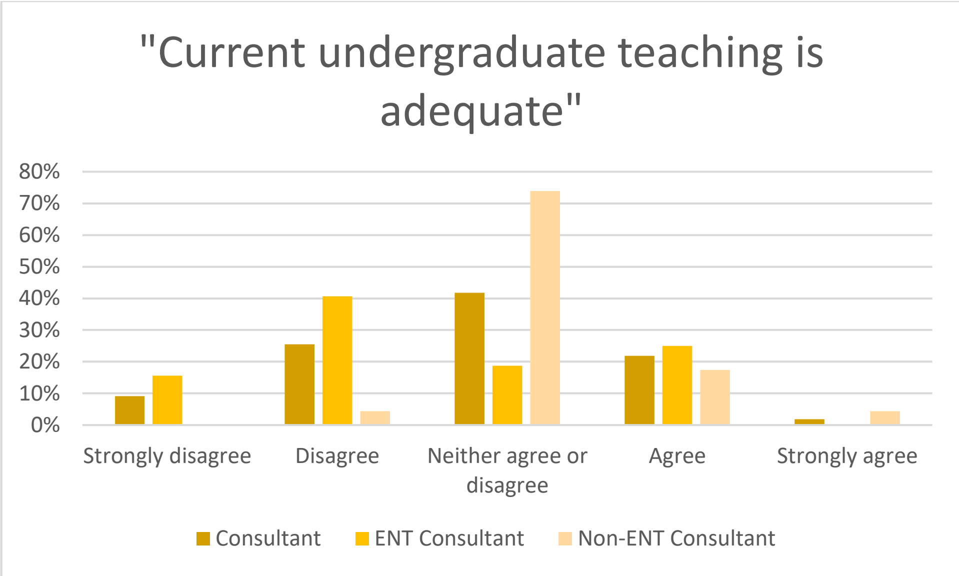

Figure 18: Bar chart showing participant's opinion on the adequacy of current undergraduate otolaryngology teaching with responses from consultants split into otolaryngology and non-otolaryngology consultants.

Overall, all groups agreed or strongly agreed (92%) that there was a need for otolaryngology in the undergraduate curriculum (*Figure 19*). Subgroup analysis of the data split by current post revealed that non-otolaryngology consultants, were more likely to neither agree nor disagree with the need for otolaryngology in the undergraduate curriculum, however this did not reach statistical significance (p=1 for comparisons against all non-consultant groups) (*Figure 20*).

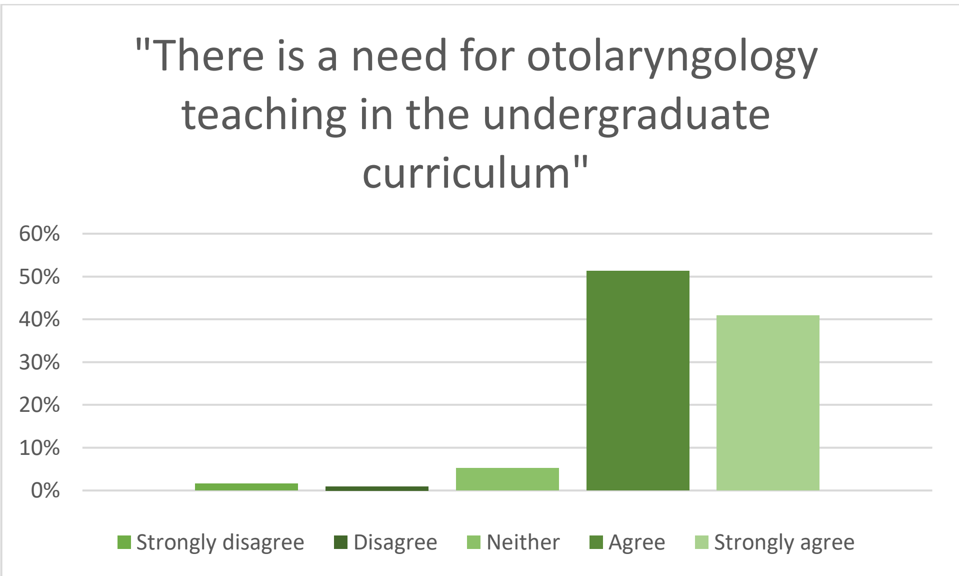

Figure 19: Bar chart showing participant's opinion for the need for otolaryngology in the undergraduate curriculum

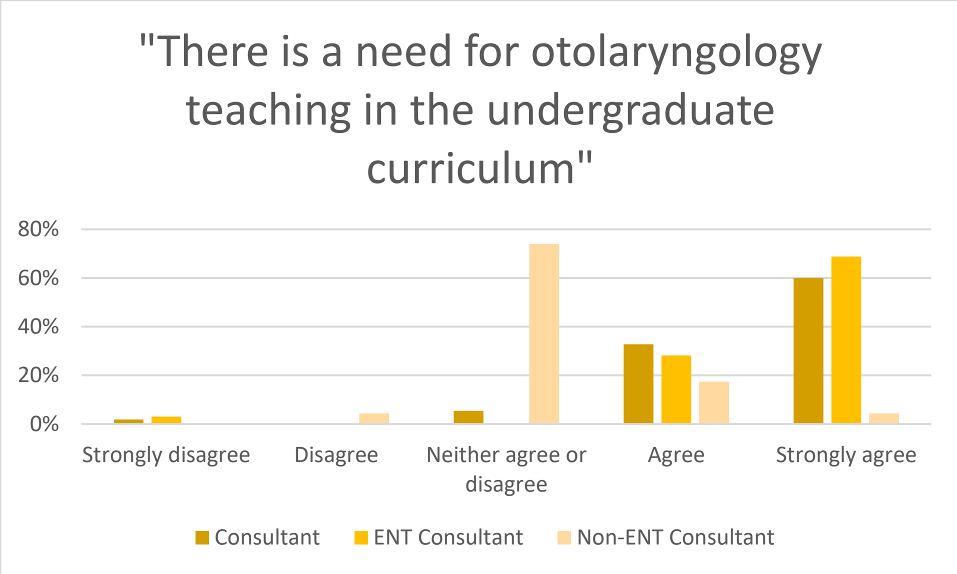

Figure 20: Bar chart showing participant's opinion for the need for otolaryngology in the undergraduate curriculum with responses from consultants split into otolaryngology and non-otolaryngology consultants.

The majority of participants felt that there would be value in a national undergraduate otolaryngology curriculum with 88% agreeing or strongly agreeing (*Figure 21*).

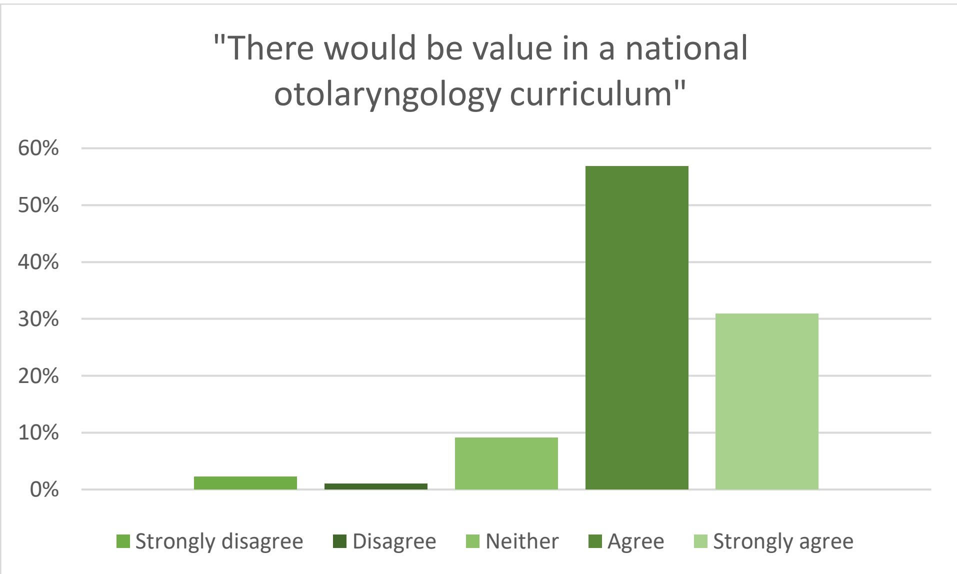

Figure 21: Bar chart showing participant's opinion for the question relating to the value of a national undergraduate otolaryngology curriculum.

Free text responses

Free text responses were invited to enable participants to provide information in addition to the forced response structure of the questionnaire. In-depth analysis of these comments was not undertaken as part of this study, however, comments could generally be grouped into a number of common areas. Participants commented on their own undergraduate training. Many highlighted their perception that their training had been inadequate, although there were comments relating to good practice within some medical schools. A number of comments mentioned specific topics or areas, such as examination skills, which respondents felt were important for inclusion in an undergraduate otolaryngology curriculum. Other comments received related to how otolaryngology topics play a role in a respondents' own practice including in paediatrics, accident and emergency medicine and general practice.

Otolaryngology clinical topic results

In the following tables, the **mode response** is highlighted in green. It is acknowledged that for a number of topics, the percentage of participants selecting different responses was similar and therefore numerical data has been presented so that where clear consensus (taken as greater than 50%) has not been achieved, the frequency of responses (as a percentage) is available.

Table 24: Mode response for all respondents for examination skills highlighted in green.

Examination skill/ Level	Not required	Should know about	Should be able to perform
Laryngeal	11%	71%	18%
Dix-Hallpike	9%	64%	26%
Unterberger's	23%	60%	17%
Nasal cavity	4%	37%	59%
Oral cavity	1%	10%	89%
Throat	0%	18%	82%
Neck	0%	8%	92%
Salivary gland	6%	40%	54%
Otoscopy	1%	6%	93%
Tuning fork tests	3%	19%	78%
Romberg's test	2%	20%	78%
Test of hearing	3%	19%	78%

Participants felt that graduating medical students should be able to perform the majority of the examination skills listed (*Table 24*). The exceptions were more specialised tests such as those requiring specialist equipment or those which were more specialist in nature, for example, examination of the larynx and Unterberger's test.

Table 25: Mode response for all respondents for acute conditions highlighted in green.

Acute condition/Level	Not required to know of the condition	Be aware of condition to include it on a list of differential diagnoses	Be able to recognise the condition	Be able to recognise and assess a patient presenting with the condition	Be able to recognise, assess and initiate management for the condition
Pinna haematoma	2%	6%	42%	39%	11%
Nasal trauma	0%	3%	29%	51%	17%
Acute vertigo	0%	4%	26%	44%	26%
Peri-tonsillar abscess	0%	3%	13%	47%	37%
Head and neck foreign body	0%	5%	24%	56%	16%
Upper airway obstruction	0%	1%	10%	23%	66%
Epistaxis	0%	0%	7%	28%	65%
Tonsillitis	0%	0%	6%	13%	81%
Peri-orbital cellulitis	0%	3%	19%	34%	44%

Doctors felt that graduating medical students should be able to recognise, assess and initiate management for four acute conditions in total (*Table 25*). These included both common otolaryngology emergencies such as epistaxis and tonsillitis and serious otolaryngology emergencies which may be life or sight threatening such as upper airway obstruction and peri-orbital cellulitis. It is however noted that this did not reach the 50% level needed for consensus for peri-orbital cellulitis.

Table 26: Mode response for all respondents for investigations highlighted in green. NA = not applicable indicating that this response option was not available to participants for this question.

Investigation/ level	Not need to know about	Be aware that investigation exists	Understand indications for investigation	Be able to interpret investigation	Be able to perform	Understand indications and be able to interpret investigation	Be able to perform and interpret investigation
Audiometry	0%	19%	56%	17%	NA	9%	NA
Tympanometry	0%	31%	54%	7%	NA	3%	NA
Neonatal hearing Screening	0%	36%	53%	5%	NA	5%	NA
Vestibular function testing	0%	41%	46%	6%	NA	5%	NA
Allergy testing	0%	19%	63%	14%	1%	NA	3%
Throat swabs	0%	6%	19%	7%	17%	NA	51%
Glandular fever tests	0%	5%	20%	17%	9%	NA	48%

Generally, participants felt that medical students should understand the indications for the listed investigations and, except for throat swabs and tests for glandular fever, there was no requirement for students to be able to perform or interpret the vast majority of specialist otolaryngological investigations (*Table 26*).

Table 27: Mode response for all respondents for procedures highlighted in green.

Procedure/ Level	No need to have heard of	Have heard of	Should be aware of the indications for	Should be aware of the indications for, and have observed the procedure	Should be aware of the indications for, have observed and can perform the procedure
Videostroboscopy	31%	31%	30%	7%	1%
Functional Endoscopic Sinus Surgery	15%	38%	38%	8%	1%
Cricothyroidotomy	3%	22%	55%	16%	4%
Nasendoscopy	6%	22%	39%	31%	1%
Indirect laryngoscopy	10%	33%	36%	19%	1%
Fine needle aspiration	1%	15%	52%	29%	3%
Grommet insertion	1%	15%	62%	21%	1%
Mastoid surgery	6%	40%	47%	7%	1%
Tracheostomy	0%	9%	62%	27%	2%
Tonsillectomy	0%	9%	64%	25%	1%
Septoplasty	6%	30%	53%	11%	1%
Nasal packing	0%	4%	28%	39%	29%
Nasal cautery	0%	6%	38%	42%	14%

The mode response of participants indicated that a graduating medical student should be aware of the indications for the majority of otolaryngology procedures listed but not necessarily have observed any procedures expect for nasal packing and nasal cautery (*Table 27*). For no procedure did respondents indicate that students should be able to perform the procedure.

Table 28: Mode response for all respondents for psychosocial / non-technical skills topics highlighted in green.

Psychosocial topic/ Level	Not important at all	Of little importance	Average importance	Very important	Essential
Communicating with laryngectomees	1%	11%	44%	33%	11%
MDT approach to voice disorders	3%	14%	48%	29%	6%
Behavioural and psychological factors in disease	1%	9%	48%	34%	8%
Psychosocial impact of prolonged vertigo	1%	10%	48%	33%	7%
Educational consequences of hearing loss	0%	3%	32%	42%	22%
Social consequences of hearing loss	0%	3%	30%	46%	20%
Effective communication with a hearing impaired individual MDT approach to deafness	0%	2%	22%	43%	32%
The importance of voice in communication	0%	6%	32%	42%	19%
The multidisciplinary team approach to deafness	2%	7%	37%	43%	12%

Table 28 shows that the mode response from participants was that hearing loss, its consequences and subsequent multidisciplinary management were very important topics to cover at an undergraduate level. The importance of voice in communication was also shown to be very important topic.

Table 29: Mode response for all respondents for otology clinical conditions highlighted in green.

Clinical conditions: Otology / Level	Should not be included in an undergraduate curriculum	Be aware of condition to include it on a list of differential diagnoses	Be able to take a history and examine a patient appropriately for this condition	Be able to organise appropriate investigations for this condition (if required)	Be able to manage this condition
Ototoxicity	0%	44%	34%	19%	3%
Otosclerosis	9%	48%	30%	12%	1%
Auditory processing disorder	21%	46%	24%	9%	0%
Congenital hearing loss	2%	46%	36%	16%	1%
Vestibular migraine	8%	41%	31%	14%	6%
Presbyastasis	16%	43%	25%	11%	4%
Aural polyps / granulations	11%	41%	32%	14%	2%
Vestibular schwanomma	6%	55%	25%	15%	0%
Barotrauma	8%	52%	30%	9%	1%
Eustachian Tube Dysfunction	7%	37%	33%	13%	9%
Tympanosclerosis	13%	45%	28	12%	2%
Chondrodermatis nodularis helicis	32%	38%	18%	8%	4%
Presbyacusis	5%	34%	35%	21%	4%
Noise induced hearing loss	2%	37%	39%	21%	2%
Conductive hearing loss	0%	18%	45%	34%	4%
Sensorineural hearing loss	0%	18%	45%	35%	2%
Vestibular neuritis	0%	25%	37%	19%	19%
Meniere's disease	1%	27%	38%	24%	10%
BPPV	1%	23%	36%	20%	20%
Complications of middle ear disease	2%	31%	40%	22%	5%
Chronic otitis media	0%	15%	41%	34%	9%
Chronic otitis media with effusion	0%	9%	40%	36%	15%
Mastoiditis	0%	19%	39%	28%	13%
Facial nerve palsy	0%	6%	48%	34%	12%
Tinnitus	0%	21%	40%	30%	8%
Tympanic membrane perforation	1%	12%	47%	27%	13%
Acute otitis media	0%	6%	21%	18%	55%
Otitis externa	0%	6%	27%	16%	51%

In just under half of the otological conditions, the mode response of participants was for students to simply be aware of the condition to include it on a list of differential diagnoses (*Table 29*). For 50% of the conditions, the mode response was that students should be able to take a history and examine a patient appropriately for the specific condition. For both acute otitis media and otitis externa, the majority of participants indicated that students should be able to manage the condition.

Table 30: Mode response for all respondents for rhinology clinical conditions highlighted in green.

Clinical conditions: Rhinology / Level	Should not be included in an undergraduate curriculum	Be aware of condition to include it on a list of differential diagnoses	Be able to take a history and examine a patient appropriately for this condition	Be able to organise appropriate investigations for this condition (if required)	Be able to manage this condition
Atypical facial pain	6%	42%	31%	18%	3%
Non-allergic rhinitis	1%	15%	34%	22%	28%
Chronic rhinosinusitis	1%	23%	39%	25%	11%
Septal deviation	4%	24%	47%	23%	2%
Allergic rhinitis	0%	9%	32%	18%	42%
Acute rhinosinusitis	1%	16%	31%	18%	34%

Allergic rhinitis and acute rhinosinusitis were the only two rhinology conditions for which the mode response of participants was for students to be able to manage the condition by graduation (*Table 30*). The mode response indicated that doctors also felt that graduates should have the knowledge and skills to allow appropriate history taking and examination of patients presenting with non-allergic rhinitis, chronic rhinosinusitis and septal deviation.

Table 31: Mode response for all respondents for laryngology and other clinical conditions highlighted in green.

Clinical conditions: Laryngology and other / Level	Should not be included in an undergraduate curriculum	Be aware of condition to include it on a list of differential diagnoses	Be able to take a history and examine a patient appropriately for this condition	Be able to organise appropriate investigations for this condition (if required)	Be able to manage this condition
Benign vocal cord lesions	5%	59%	25%	11%	0%
Laryngeal papillomatosis	19%	55%	19%	6%	0%
Laryngomalacia	15%	53%	24%	8%	0%
Muscle tension dysphonia	27%	50%	17%	6%	0%
Vocal cord palsy	3%	52%	31%	14%	1%
Salivary gland disorders	3%	17%	37%	40%	3%
Branchial cyst	6%	41%	33%	17%	3%
Pharyngeal pouch	5%	40%	31%	22%	2%
Globus pharyngeus	9%	43%	29%	15%	4%
Laryngo-pharyngeal reflux	8%	34%	28%	18%	13%
Thyroglossal duct cyst	4%	34%	36%	23%	4%
Pharyngitis	2%	17%	32%	19%	30%
Thyroid disorders	0%	6%	28%	43%	22%
Obstructive sleep apnoea	0%	17%	34%	42%	7%
Laryngitis	0%	19%	30%	20%	31%
Epiglottitis	0%	11%	28%	30%	31%
Croup	0%	9%	26%	24%	41%

The mode response from doctors was for students to be able to manage laryngitis, epiglottitis and croup by graduation although it is noted that there was no clear consensus for these conditions (*Table 31*).

Table 32:Table showing the percentage of participants who indicated that each of the above aspects of the head and neck cancers was important for a graduating medical student to know about.

Site	Aetiology	Presentation	Red flags	Staging	Management	Prognosis
Laryngeal	62.3	81.5	96.4	17.5	29.9	22.7
Pharyngeal	54.9	79.6	94.5	10.4	19.8	16.2
Nasal	46.1	76	89.3	6.5	15.6	10.7
Salivary	41.9	78.3	88.3	6.2	16.5	12.3
Thyroid	50.3	80.8	92.5	16.9	32.5	25
Skin	62	81.8	93.2	24.7	38.6	29.9
Unknown primary	47.5	75.7	89	11	25.3	13.6

Table 32 shows that doctors felt that the aetiology of a cancer, how it presents and 'red flags' of its presence were important for a student to know about. Staging, management and prognosis were deemed less important.

Subgroup analysis by current post of participant

Overview of results

Eight themes were analysed for statistical differences between groups by the current post of the participant: foundation year doctors (n=76), specialty trainees (n=111), general practitioners (n=61) and consultants (n=55). This included a total of 101 individual topics. Of these, 80 topics (79%) showed a statistically significant difference between groups (*Table 33*). Post-hoc analysis was then performed with a correction for multiple comparisons. This showed that a statistically significant difference remained between groups for 76 of the topics. *Table 33* also shows the number of statistically significant differences between individual groups.

Table 33: Illustrating the number of topics where there was a statistically significant difference between groups based on the current post of the participant and, following post-hoc analysis, the number of topics where there was a difference between individual groups.

Total number of topics within theme	**Number of topics where there was a statistically significant difference**	**Groups for comparison**	**Number of topics where there was a statistically significant difference between individual groups**
101	80	Consultant and foundation year doctor	55
		Consultant and general practitioner	43
		Foundation year doctor and specialty trainee	26
		General practitioner and specialty trainee	20
		Consultant and specialty trainee	18
		Foundation year doctor and general practitioner	12

Examination skills

Twelve examination skills were included in the questionnaire. Statistically significant differences were seen between groups in seven of the twelve (*Table 34*). Post hoc analysis was undertaken using the same principles as previously stated.

For *Table 34* to *Table 41*: Topics where there is a statistically significant difference between groups dependent on their current post are highlighted in yellow. The distributions column indicates whether distributions were similar between groups when assessed by visual inspection of a boxplot. H test refers to the Kruskal Wallis H test result. There were 3 degrees of freedom for all tests.

Table 34: Examination skills

	Examination skills	Distribution	H test	*p*-value
1	Nasal examination	Similar	6.303	.098
2	Oral examination	Similar	18.984	<.001
3	Throat examination	Not similar	20.196	<.001
4	Laryngeal examination	Not similar	10.834	.013
5	Neck examination	Similar	7.344	.062
6	Salivary gland examination	Not similar	22.274	<.001
7	Otoscopy	Similar	1.027	.795
8	Tuning fork tests	Not similar	35.600	<.001
9	Romberg's test	Not similar	15.061	.002
10	Dix-Hallpike test	Not similar	2.041	.564
11	Unterberger's test	Not similar	4.972	.174
12	A test of hearing	Not similar	15.039	.002

Post hoc analysis of oral examination showed statistically significant differences between foundation year doctors and specialty trainees (*p*=.01), foundation year doctors and general practitioners (*p*=.008) and foundation year doctors and consultants (*p*=<.001). Despite these differences, *Figure 22* shows that all groups indicated that students should be able to perform this examination.

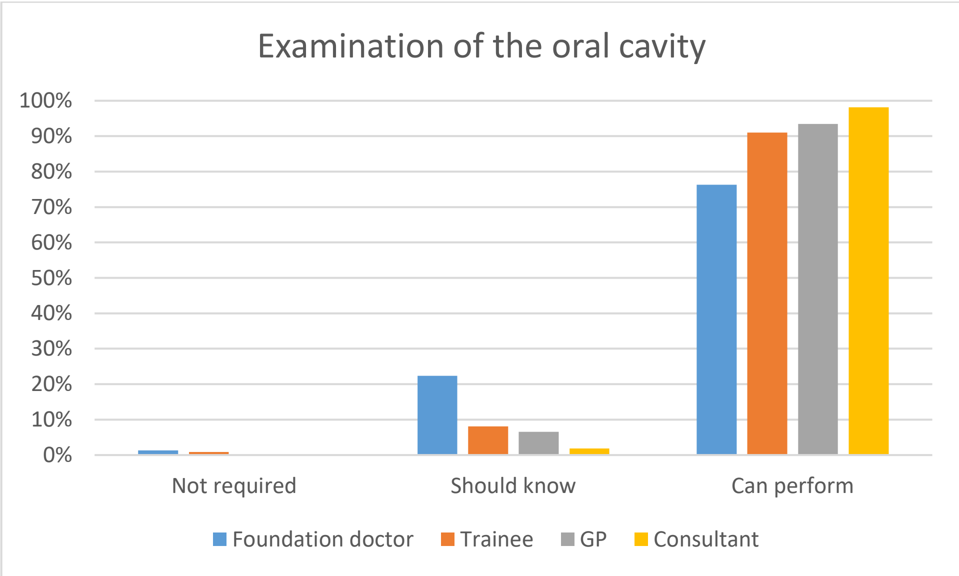

Figure 22: Bar chart showing responses to examination of the oral cavity by current post of the participant

Post hoc analysis of throat examination showed statistically significant differences between consultants and specialty trainees (*p*=.015), consultants and general practitioners (*p*=<.001) and foundation year doctors and general practitioners (*p*=.039). Despite the differences, all groups again indicated that students should be able to perform this examination (*Figure 23*).

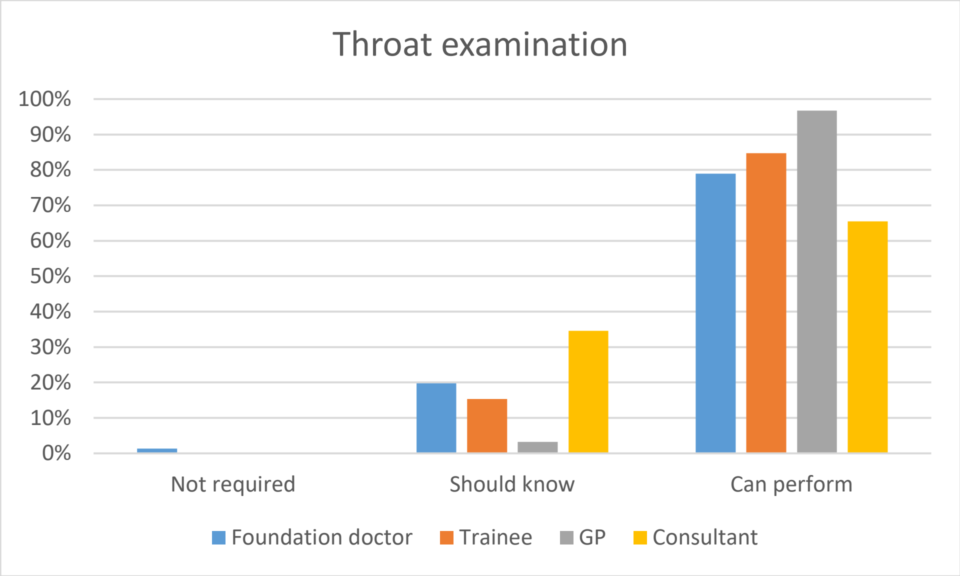

Figure 23: Bar chart showing responses to throat examination by current post of the participant

Post hoc analysis of laryngeal examination showed statistically significant differences between consultants and general practitioners (p=.009). Although there was a statistical difference between these two groups, all groups indicated that students should know about this examination (*Figure 24*).

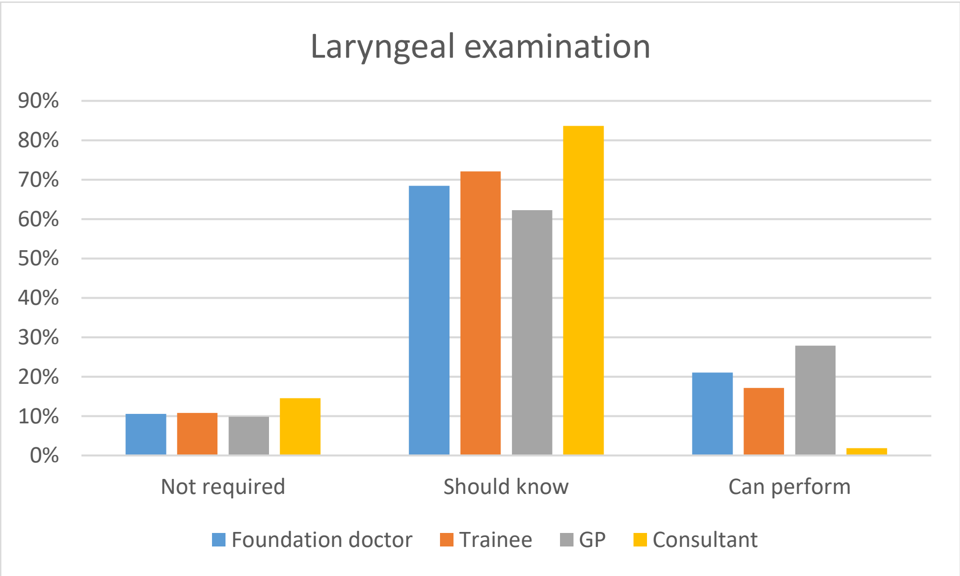

Figure 24: Bar chart showing responses to laryngeal examination by current post of the participant

Post hoc analysis of salivary gland examination showed statistically significant differences between foundation year doctors and consultants (*p*=.047), foundation year doctors and general practitioners (*p*=<.001) and specialty trainees and general practitioners (*p*=.005). Despite this, all groups apart from foundation doctors, felt that students should be able to perform this examination (*Figure 25*).

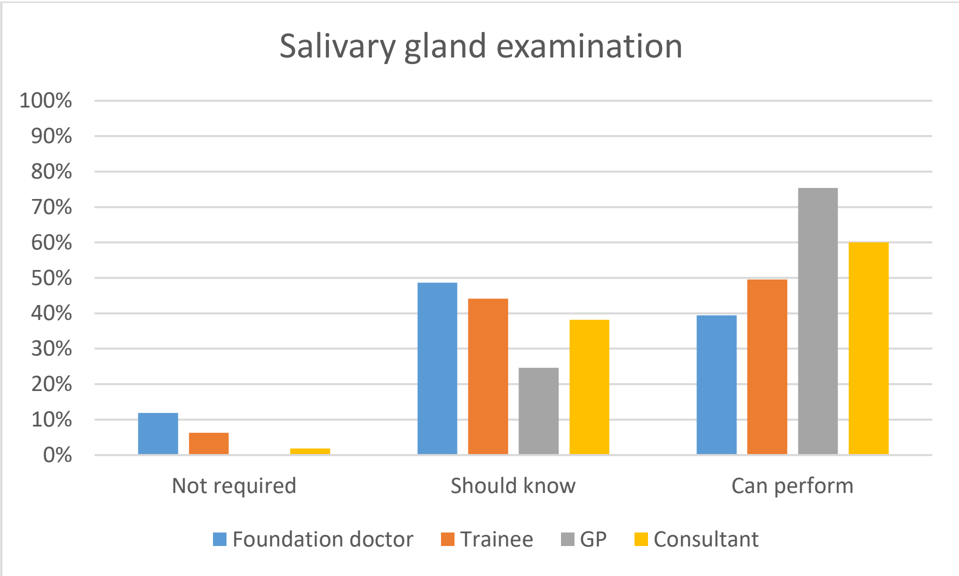

Figure 25: Bar chart showing responses to salivary gland examination by current post of the participant

Post hoc analysis of tuning fork tests showed statistically significant differences between consultants and general practitioners (*p*=.013), consultants and specialty trainees (*p*=<.001) and consultants and foundation year doctors (*p*=<.001). Overall, the mode response from all groups was for students to be able to perform tuning fork tests (*Figure 26*).

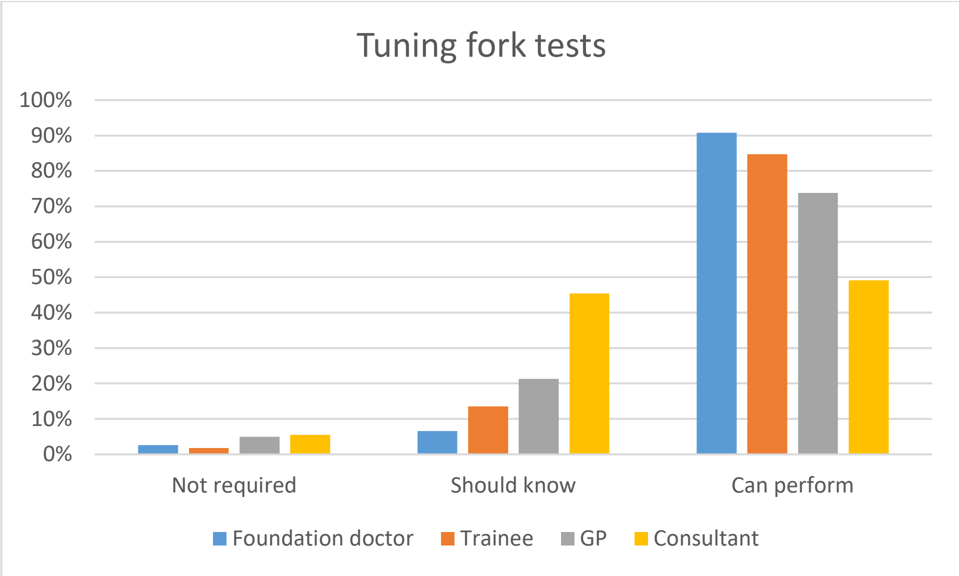

Figure 26: Bar chart showing responses to tuning fork tests by current post of the participant

Post hoc analysis of Romberg's test showed statistically significant differences between consultants and specialty trainees (*p*=.006) and general practitioners and specialty trainees (*p*=.042). Again, despite the statistical differences, all groups felt that students should be able to perform this test (*Figure 27*).

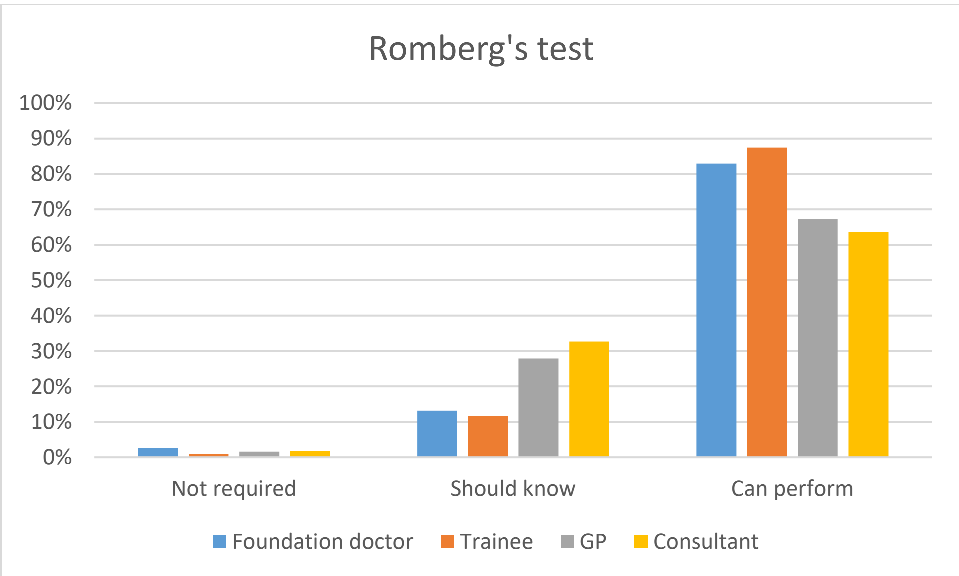

Figure 27: Bar chart showing responses to Romberg's test by current post of the participant

Post hoc analysis of a test of hearing showed statistically significant differences between consultants and specialty trainees (*p*=.004) and consultants and foundation year doctors (*p*=.006). All groups, however, felt that students should be able to perform a test of hearing (*Figure 28*).

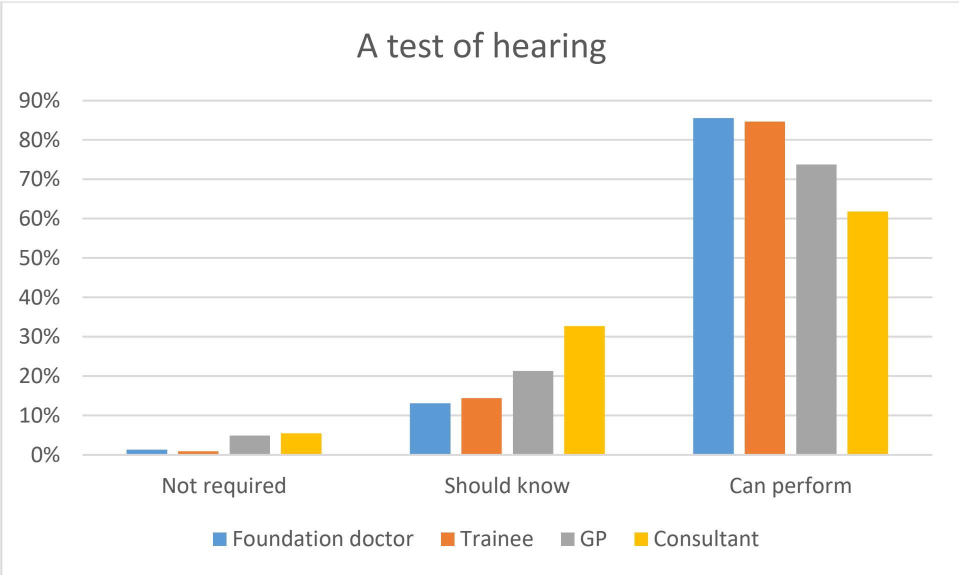

Figure 28: Bar chart showing responses to a test of hearing by current post of the participant

Acute conditions

Nine otolaryngological acute conditions were included in the questionnaire. Statistically significant differences were seen between groups in five of the nine (*Table 35*). Post hoc analysis was undertaken using the same principles as previously stated.

Table 35: Acute conditions

	Acute conditions	Distribution	H test	*p*-value
1	Upper airway obstruction	Not similar	5.959	.114
2	Epistaxis	Not similar	6.308	.098
3	Nasal trauma	Similar	8.421	.038
4	Acute vertigo	Not similar	17.015	.001
5	Pinna haematoma	Similar	3.716	.294
6	Tonsillitis	Not similar	19.877	<.001
7	Quinsy / peri-tonsillar abscess	Not similar	13.555	.004
8	Head and neck foreign bodies	Not similar	7.654	.054
9	Orbital cellulitis	Similar	10.905	.012

Post hoc analysis revealed no significant inter group differences for nasal trauma.

Post hoc analysis of acute vertigo showed statistically significant differences between consultants and general practitioners (p=.001) and specialty trainees and general practitioners (p=.006). Despite the statistical differences, the mode response from all groups was that students should be able to recognise and assess a patient with acute vertigo (*Figure 29*).

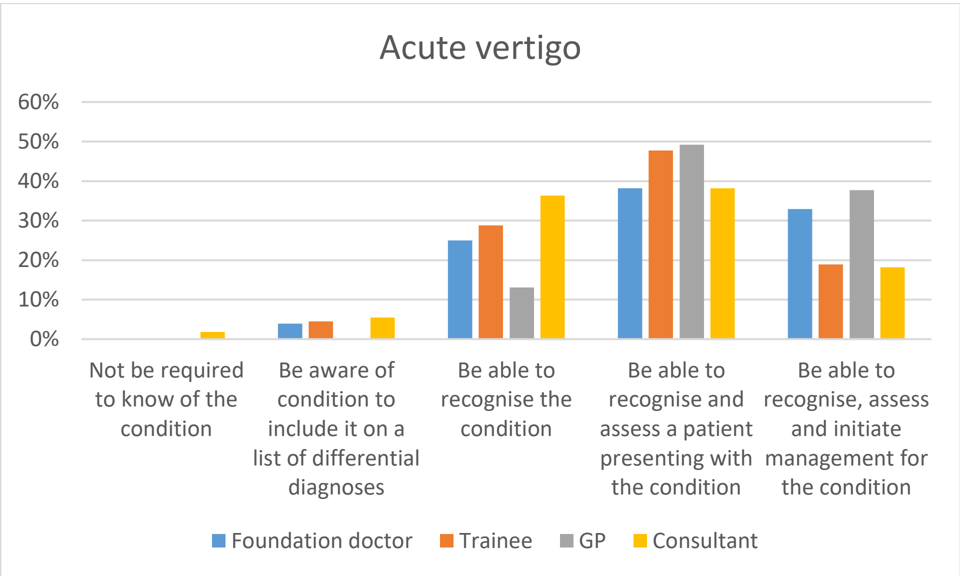

Figure 29: Bar chart showing responses to acute vertigo by current post of the participant

Post hoc analysis of tonsillitis showed statistically significant differences between consultants and general practitioners (*p*=.034), consultants and foundation year doctors (*p*=.005), specialty trainees and general practitioners (*p*=.035) and, specialty trainees and foundation year doctors (*p*=.03). Again, despite the statistical differences between groups, all groups felt that students should be able to initiate management for this condition (*Figure 30*).

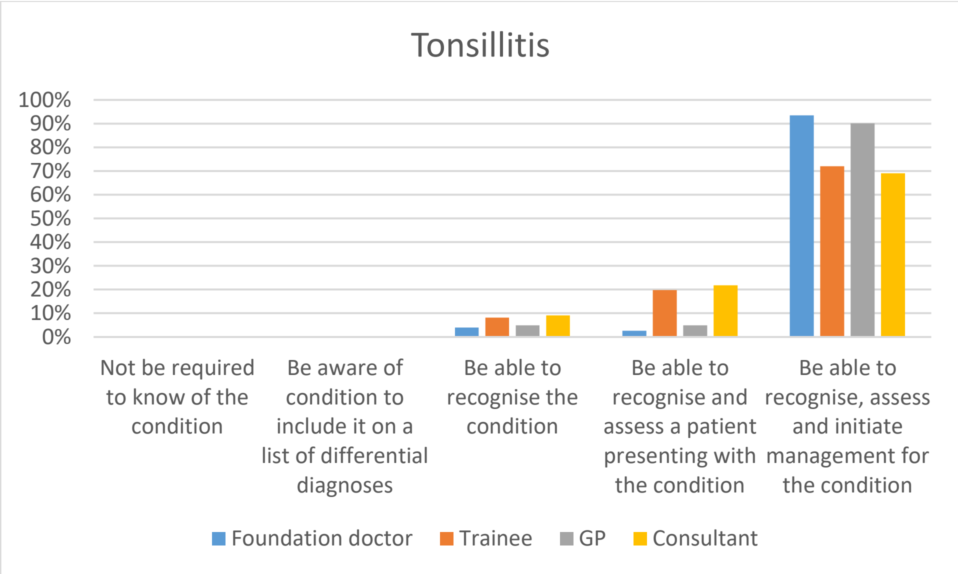

Figure 30: Bar chart showing responses for tonsillitis by current post of the participant

Post hoc analysis of quinsy/ peritonsillar abscess showed statistically significant differences between consultants and foundation year doctors (*p*=.018) and specialty trainees and foundation year doctors (*p*=.007). The mode response for all groups except foundation year doctors was for students to be able to recognise and assess a patient with a peri-tonsillar abscess (*Figure 31*). Foundation year doctors were more likely to indicate that they should be able to initiate management for this condition.

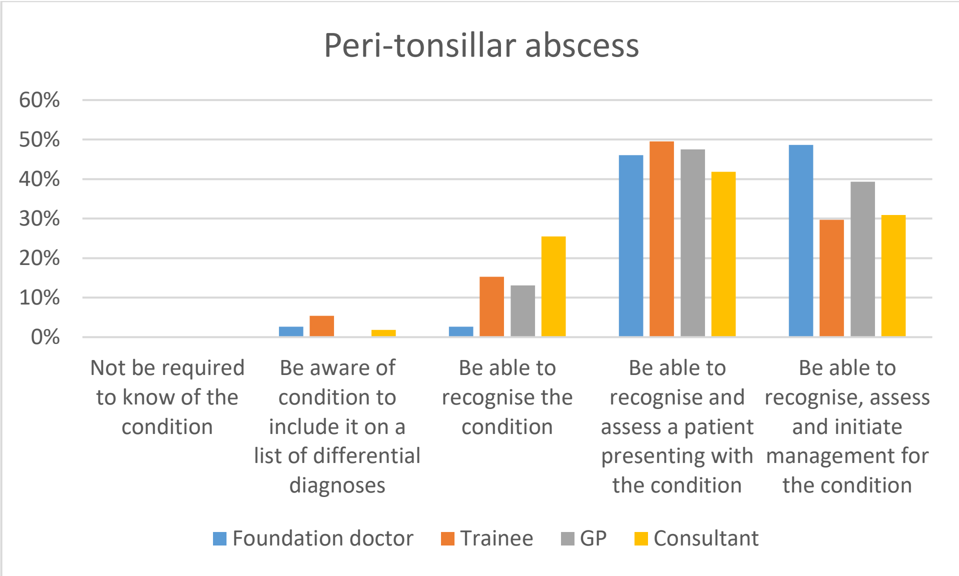

Figure 31: Bar chart showing responses for peri-tonsillar abscess by current post of the participant

Post hoc analysis of orbital cellulitis showed statistically significant differences between consultants and specialty trainees (p=.031), consultants and foundation year doctors (p=.026) and consultants and general practitioners (p=.031). The mode response for all groups except consultants was that students should be able to initiate management for this condition. Consultants were more likely to indicate that students should simply be able to recognise orbital cellulitis (*Figure 32*). When the consultant group is examined in more detail (*Figure 33*), it can be seen that it was otolaryngology consultants who were most likely to respond that students should simply be able to recognise orbital cellulitis.

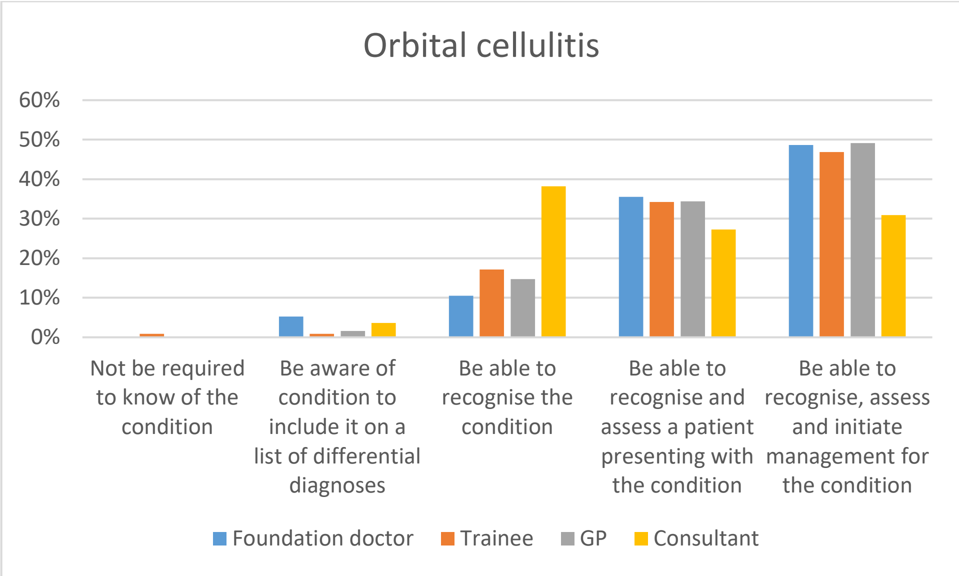

Figure 32: Bar chart showing responses for orbital cellulitis by current post of the participant

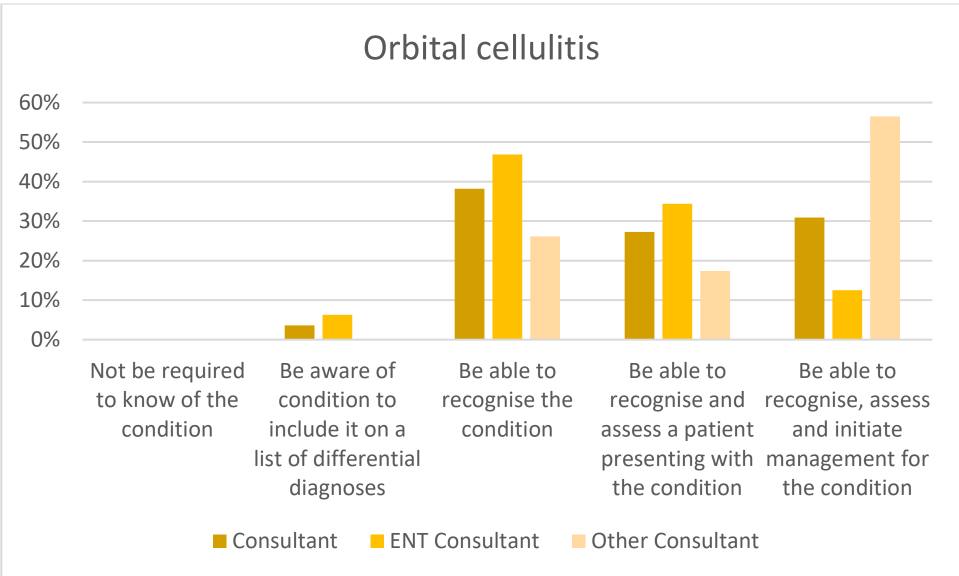

Figure 33: Bar chart showing responses for orbital cellulitis with the consultant group split for otolaryngology versus non-otolaryngology consultants

Investigations

Seven otolaryngological related investigations were asked about in the questionnaire. Statistically significant differences were seen between groups in three of the seven (*Table 36*). Post hoc analysis was undertaken using the same principles as previously stated.

Table 36: Investigations

	Investigation	Distribution	H test	*p*-value
1	Audiometry	Not similar	2.383	.497
2	Tympanometry	Similar	4.757	.190
3	Neonatal hearing screening	Not similar	12.005	.007
4	Vestibular function tests	Not similar	20.082	<.001
5	Allergy testing	Not similar	10.610	.014
6	Throat swabs	Not similar	7.289	.063
7	Tests for glandular fever	Not similar	5.919	.116

Post hoc analysis of neonatal hearing screening showed statistically significant differences between consultants and foundation year doctors (p=.009). *Figure 34* shows that the mode response for all groups except from consultants was that graduates should have an understanding of the indications for neonatal hearing screening. When the consultant group is examined in more detail (*Figure 35*) it was the otolaryngology consultants who were more likely to indicate that students should simply be aware that the investigation exists.

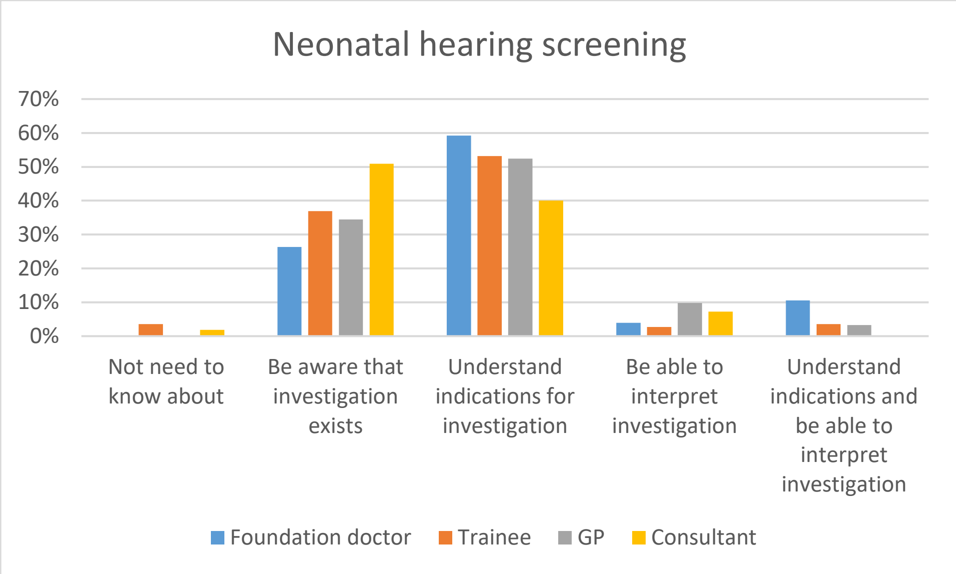

Figure 34: Bar chart showing responses for neonatal hearing screening by current post of the participant

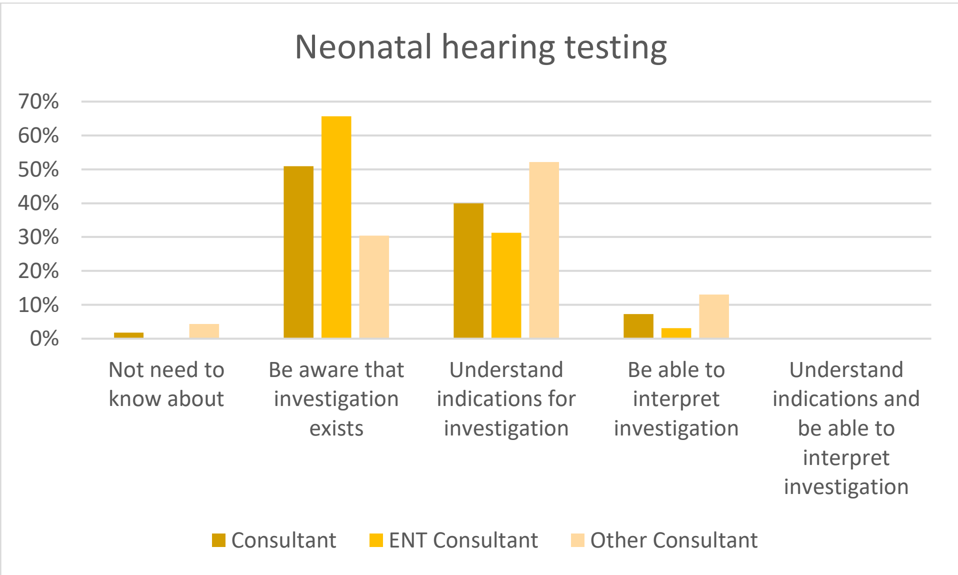

Figure 35: Bar chart showing responses for neonatal hearing screening with the consultant group split for otolaryngology versus non-otolaryngology consultants

Post hoc analysis of vestibular function testing showed statistically significant differences between consultants and general practitioners (p=.009), consultants and foundation year doctors (p=<.001) and specialty trainees and foundation year doctors (p=.019). *Figure 36* shows that the mode response for all groups except from consultants was that graduates should have an understanding of the indications vestibular function testing. Again, when the consultant group was examined in more detail

(*Figure 37*) it was the otolaryngology consultants who were more likely to indicate that students should simply be aware that the investigation exists.

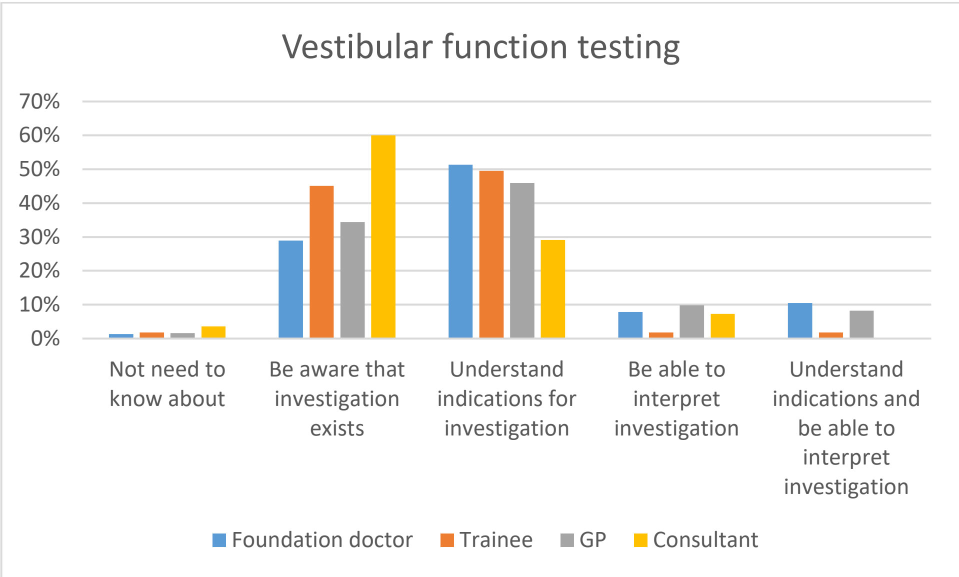

Figure 36: Bar chart showing responses for vestibular function testing by current post of the participant

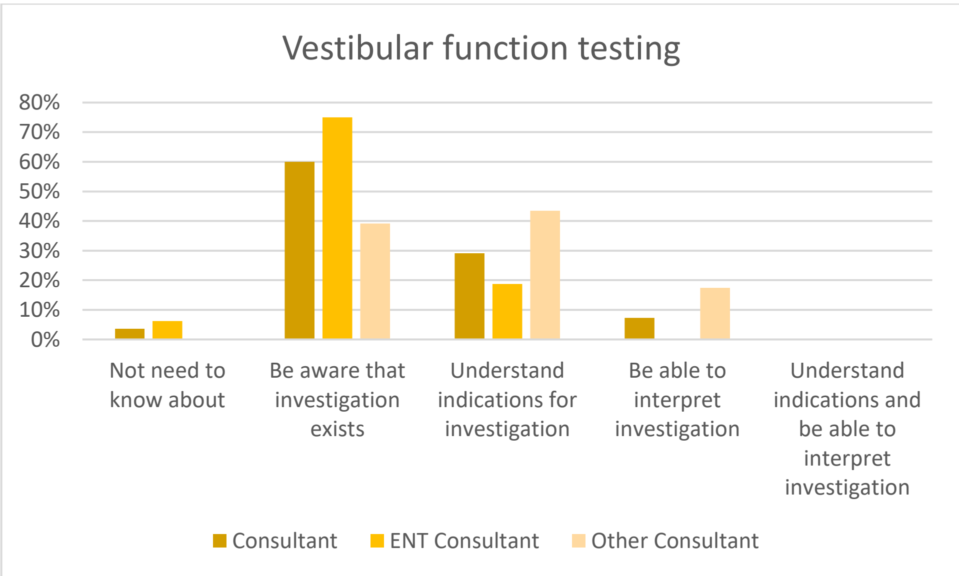

Figure 37: Bar chart showing responses for vestibular function testing with the consultant group split for otolaryngology versus non-otolaryngology consultants

Post hoc analysis of allergy testing showed statistically significant differences between consultants and foundation year doctors (*p*=.016). *Figure 38*, however, shows that the mode response for all groups was that graduates should understand the indications for allergy testing.

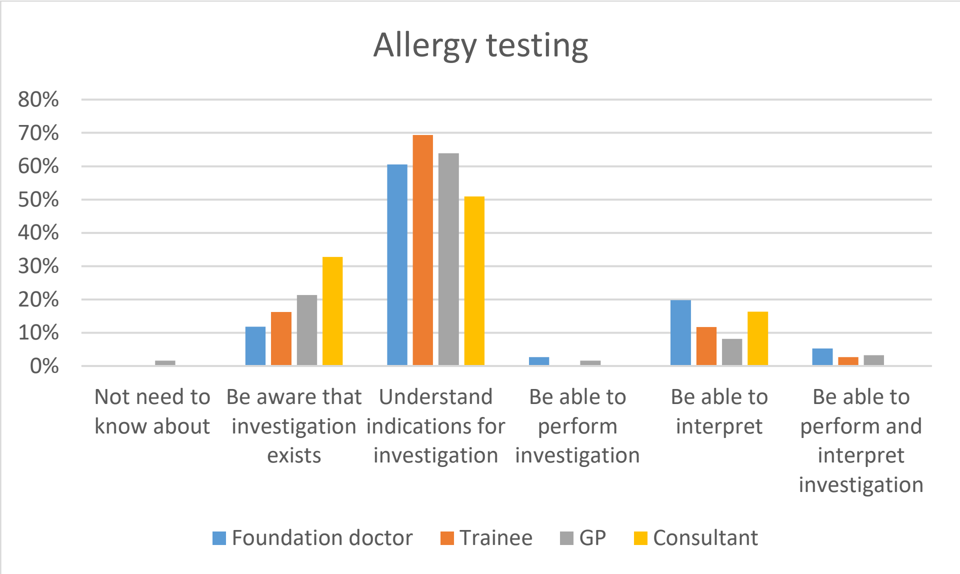

Figure 38: Bar chart showing responses for allergy testing by current post of the participant

Procedures

Thirteen otolaryngological procedures were asked about in the questionnaire. Statistically significant differences were seen between groups in 11 of the 13 (*Table 37*). Post hoc analysis was undertaken using the same principles as previously stated.

Table 37: Procedures

	Procedure	Distribution	H test	*p*-value
1	Nasal packing	Not similar	20.054	<.001
2	Nasal cautery	Similar	3.534	.316
3	Grommet insertion	Not similar	9.735	.021
4	Mastoid surgery	Not similar	13.842	.003
5	FESS	Not similar	13.318	.004
6	Tracheostomy	Not similar	26.693	<.001
7	Tonsillectomy	Not similar	9.199	.027
8	Septoplasty	Not similar	12.832	.005
9	Cricothyroidotomy	Not similar	8.507	.037
10	Nasendoscopy	Not similar	3.708	.295
11	Videostroboscopy	Not similar	13.990	.003
12	Indirect laryngoscopy	Not similar	16.146	.001
13	Fine needle aspiration for cytology	Not similar	9.297	.026

Post hoc analysis of nasal packing showed statistically significant differences between consultants and foundation year doctors (p=<.001) and general practitioners and foundation year doctors (p=.01). *Figure 39* illustrates that the mode response from general practitioners and specialty trainees was for students to be aware of the indications for and have observed nasal packing, whilst for foundation doctors it was that students should be able to perform the procedure. The mode response from consultants was that an awareness of the indications should be the level for graduating students. *Figure 40* shows that, once again, it was the otolaryngology consultants who indicated a lower level of performance than other doctors.

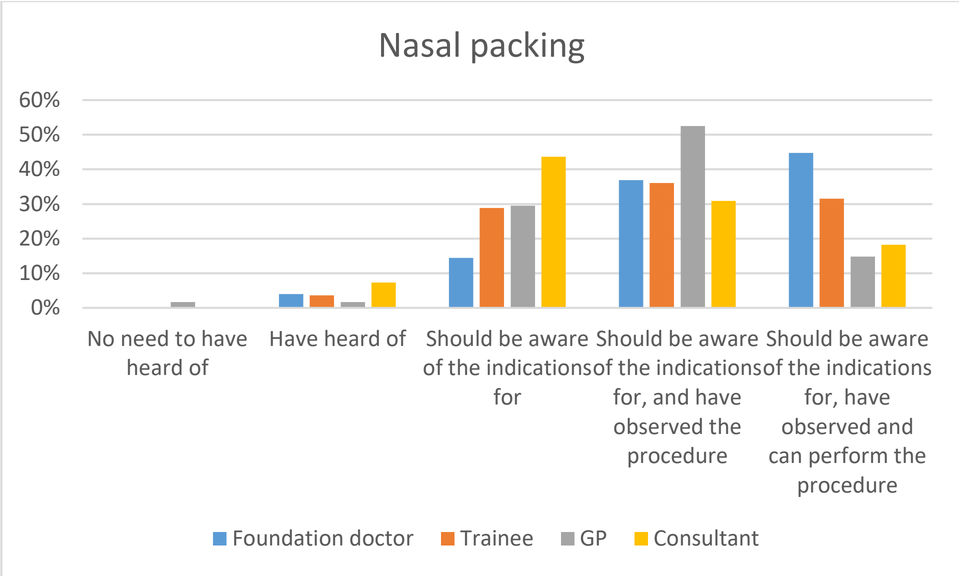

Figure 39: Bar chart showing responses for nasal packing by current post of the participant

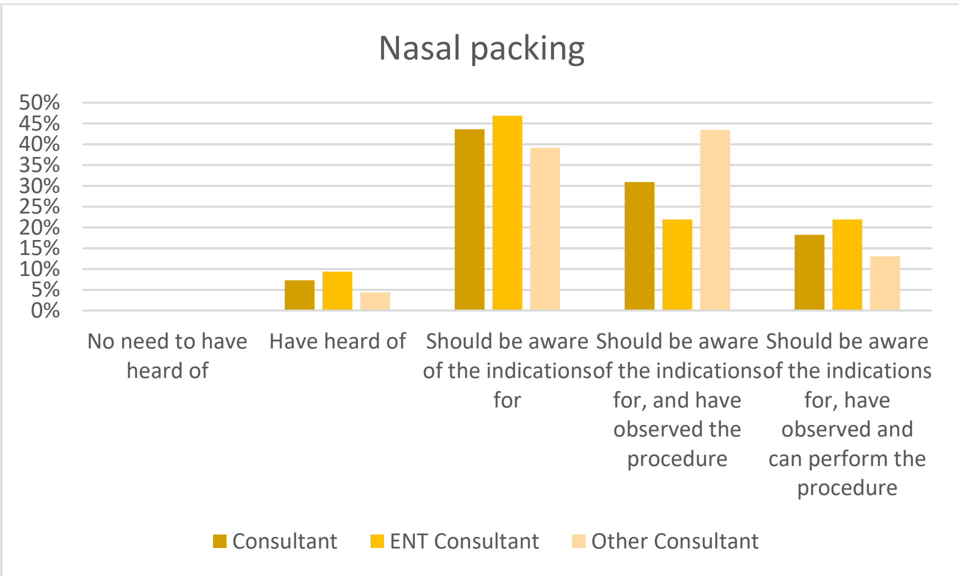

Figure 40: Bar chart showing responses for nasal packing with the consultant group split for otolaryngology versus non-otolaryngology consultants

Post hoc analysis of grommet insertion showed statistically significant differences between specialty trainees and foundation year doctors (p=.023). All groups, however, indicated that students should be aware of the indications for grommet insertion (*Figure 41*).

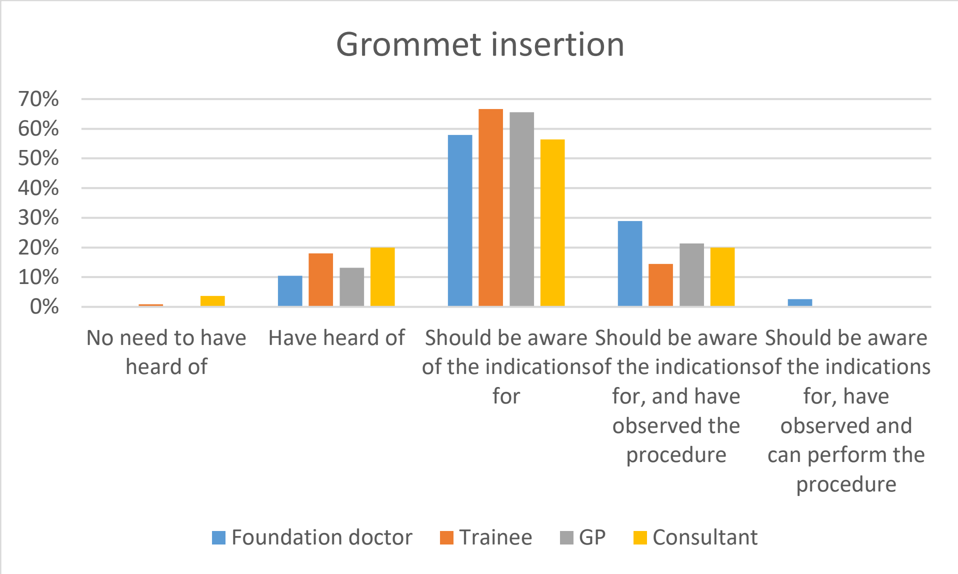

Figure 41: Bar chart showing responses for grommet insertion by current post of the participant

Post hoc analysis of mastoid surgery showed statistically significant differences between specialty trainees and general practitioners (*p*=.046) and specialty trainees and foundation year doctors (*p*=.02). Foundation year doctors and general practitioners indicated a higher level of performance (awareness of indications), whereas the mode response from consultants and specialty trainees was that students should simply have heard of mastoid surgery (*Figure 42*).

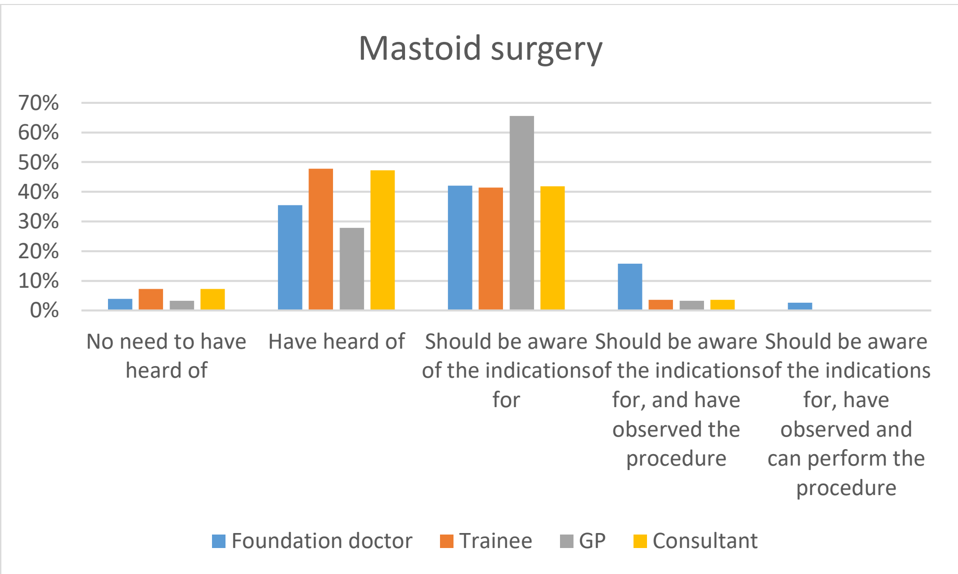

Figure 42: Bar chart showing responses for mastoid surgery by current post of the participant

Post hoc analysis of Functional Endoscopic Sinus Surgery showed statistically significant differences between specialty trainees and foundation year doctors (p=.015). Again, general practitioners and foundation year doctors indicated a higher level of performance expected of graduates than other groups (*Figure 43*).

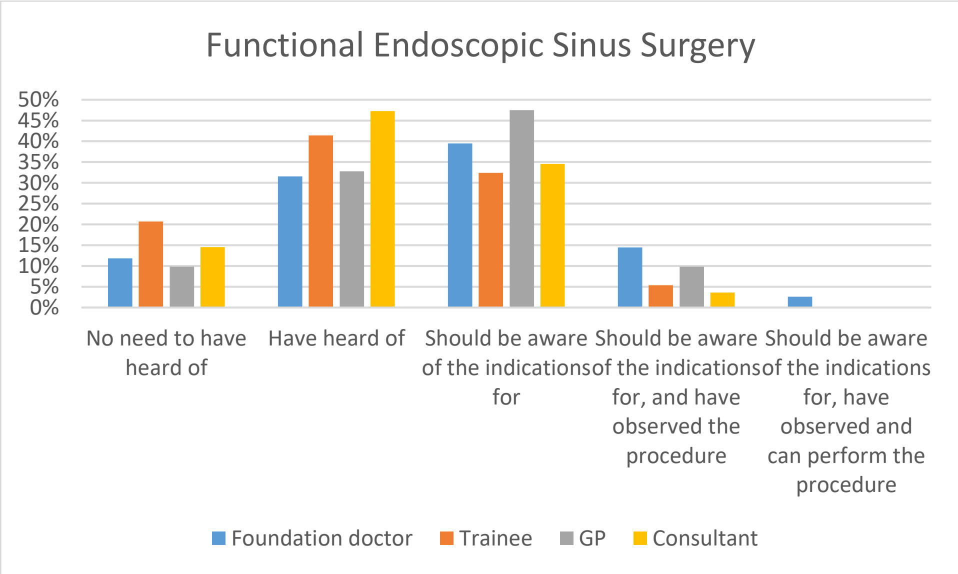

Figure 43: Bar chart showing responses for functional endoscopic sinus surgery by current post of the participant

Post hoc analysis of tracheostomy showed statistically significant differences between specialty trainees and foundation year doctors (p=<.001), general practitioners and foundation year doctors (p=<.001) and consultants and foundation year doctors (p=.001). The mode response from all groups except foundation year doctors was for students to be aware of the indications for tracheostomy. The mode response from foundation year doctors favoured students having observed this procedure (*Figure 44*).

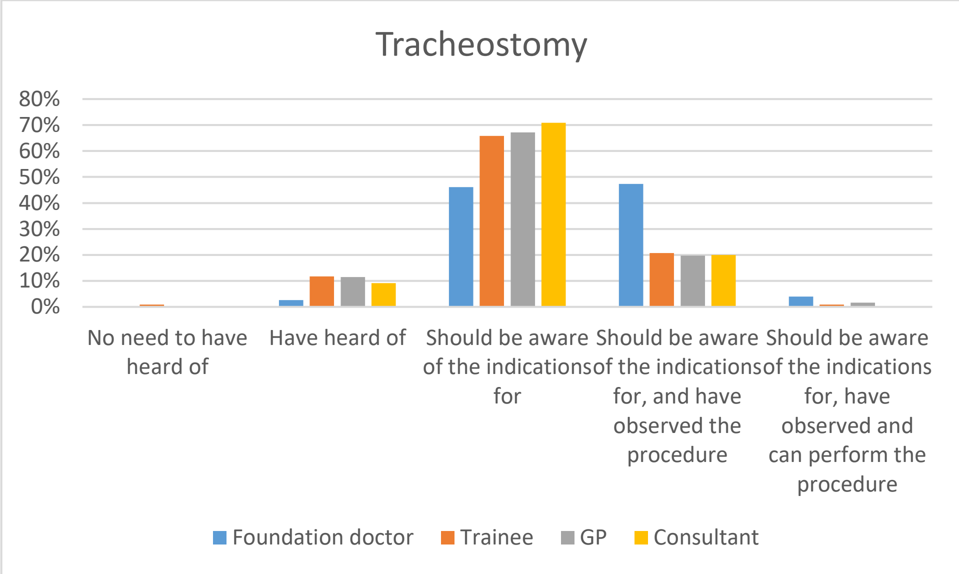

Figure 44: Bar chart showing responses for tracheostomy by current post of the participant

Post hoc analysis of tonsillectomy showed statistically significant differences between consultants and foundation year doctors (p=.018). In all groups, the majority agreed that students should be aware of the indications for tonsillectomy (*Figure 45*).

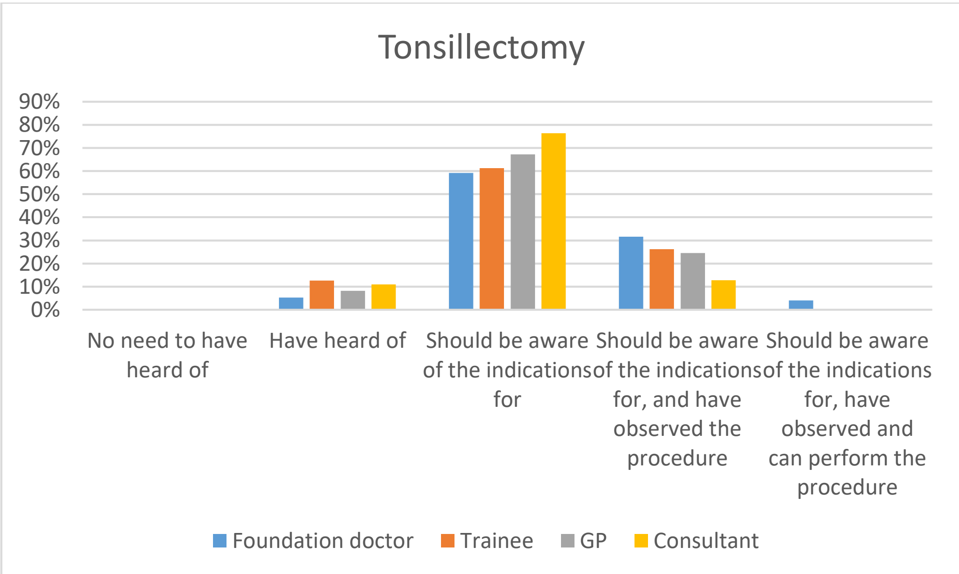

Figure 45: Bar chart showing responses for tonsillectomy by current post of the participant

Post hoc analysis of septoplasty showed statistically significant differences between consultants and general practitioners (p=.041) and specialty trainees and general practitioners (p=.038). Despite these statistical differences between groups, the mode response in each group was that students should be aware of the indications for septoplasty (*Figure 46*).

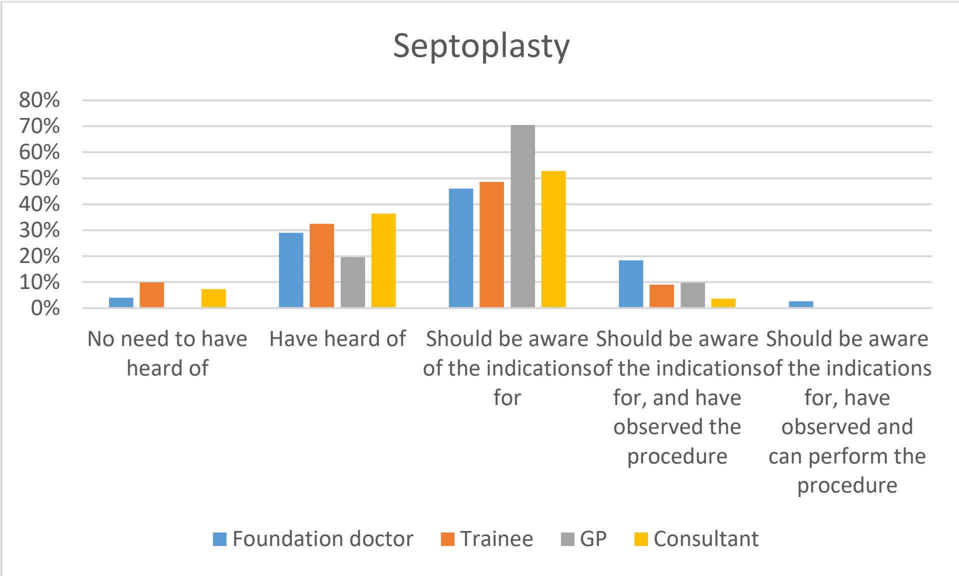

Figure 46: Bar chart showing responses for septoplasty by current post of the participant

Post hoc analysis of cricothyroidotomy showed statistically significant differences between specialty trainees and foundation year doctors (p=.047). Despite these statistical differences between groups, the majority of participants in each group felt that students should be aware of the indications for cricothyroidotomy (*Figure 47*).

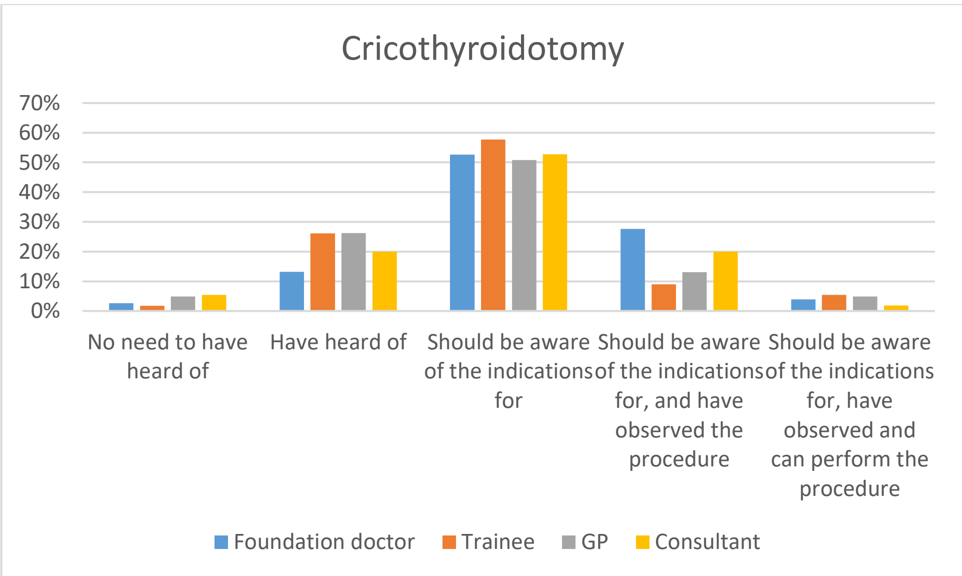

Figure 47: Bar chart showing responses for cricothyroidotomy by current post of the participant

Post hoc analysis of videostroboscopy showed statistically significant differences between consultants and foundation year doctors (p=.008) and specialty trainees and foundation year doctors (*p*=.032). It can be seen from *Figure 48* that there was a range of responses for this procedure. Consultants were most likely to indicate that graduates need not have heard of videostroboscopy.

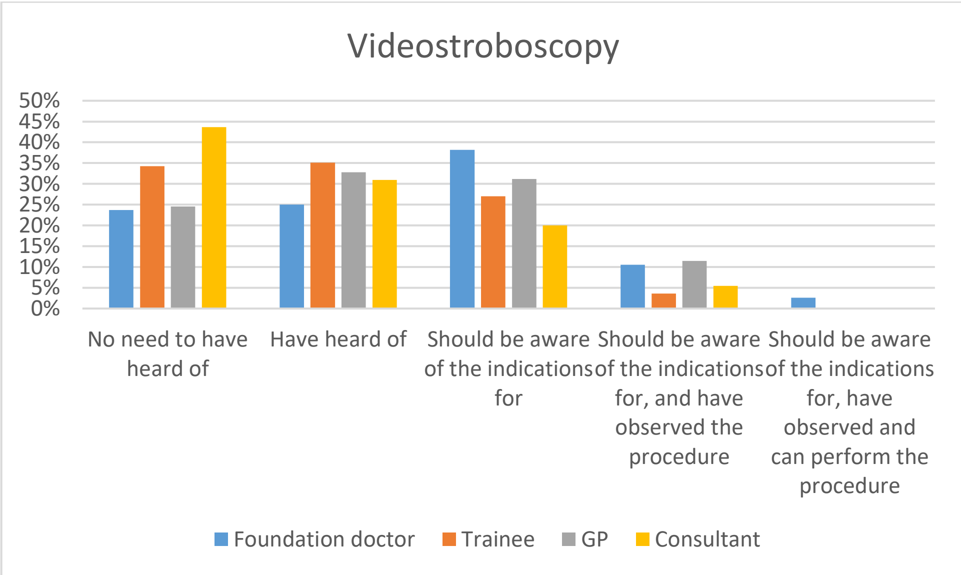

Figure 48: Bar chart showing responses for videostroboscopy by current post of the participant

Post hoc analysis of indirect laryngoscopy showed statistically significant differences between specialty trainees and foundation year doctors (*p*=.024) and specialty trainees and general practitioners (*p*=.002). *Figure 49* shows that consultants and specialty trainees were more likely to indicate that students should simply have heard of this procedure whereas foundation year doctors and general practitioners were more likely to indicate that students should also be aware of the indications for the procedure.

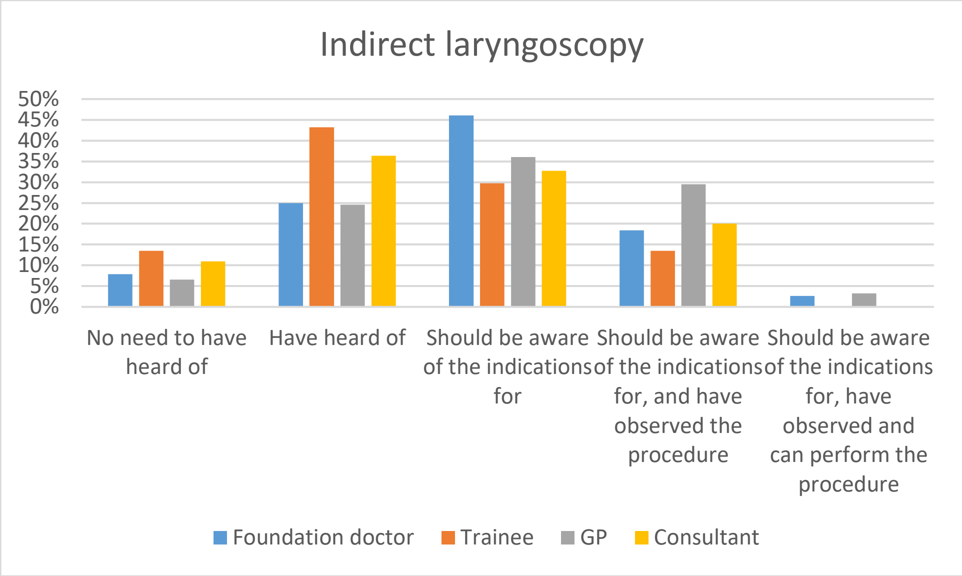

Figure 49: Bar chart showing responses for indirect laryngoscopy by current post of the participant

Post hoc analysis of fine needle aspiration for cytology showed statistically significant differences between specialty trainees and foundation year doctors (*p*=.015). Despite these statistical differences between groups, the mode response from participants in each group was that students should be aware of the indications for fine needle aspiration for cytology (*Figure 50*).

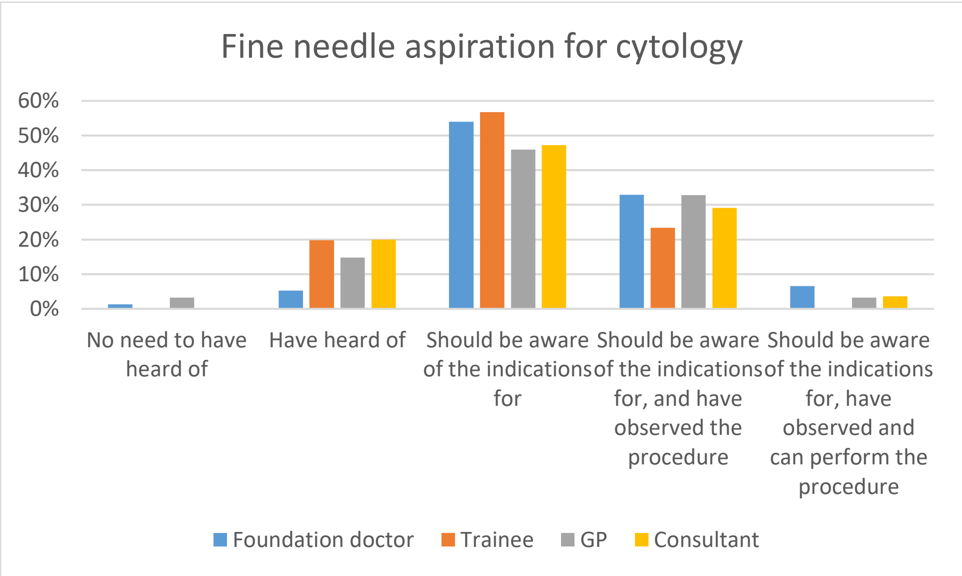

Figure 50: Bar chart showing responses for fine needle aspiration for cytology by current post of the participant

Psychosocial / non-technical skills

Nine psychosocial topics were asked about in the questionnaire. Statistically significant differences were seen between groups in five of the nine (*Table 38*). Post hoc analysis was undertaken using the same principles as previously stated.

Table 38: Psychosocial topics

	Psychosocial/ non-technical skills	Distribution	H test	*p*-value
1	Educational consequences of hearing loss	Not similar	5.225	.156
2	Social consequences of hearing loss	Similar	6.512	.089
3	Effective communication with a hearing impaired individual	Not similar	5.120	.163
4	The multidisciplinary team approach to deafness	Similar	8.527	.036
5	The importance of voice in verbal and non-verbal communication	Not similar	8.989	.029
6	Communicating with laryngectomees	Not similar	18.876	<.001
7	The multidisciplinary team approach to voice disorders	Not similar	16.879	.001
8	Behavioural and psychological factors which may contribute to ENT conditions (eg globus)	Similar	10.895	.012
9	Psychosocial consequences of prolonged vertigo	Similar	7.667	.053

Post hoc analysis of the multidisciplinary approach to deafness showed statistically significant differences between consultants and foundation year doctors (p=.041). *Figure 51* shows that consultants indicated that this was a topic of average importance compared to the other groups who felt it was very important. The otolaryngology consultants were most likely to indicate this lower importance rating (*Figure 52*).

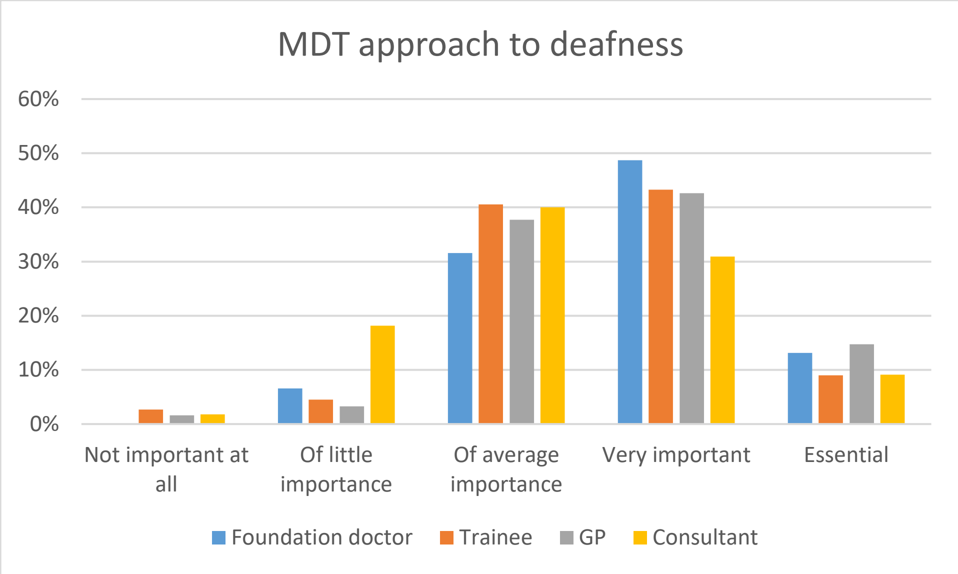

Figure 51: Bar chart showing responses for the multidisciplinary approach to deafness by current post of the participant

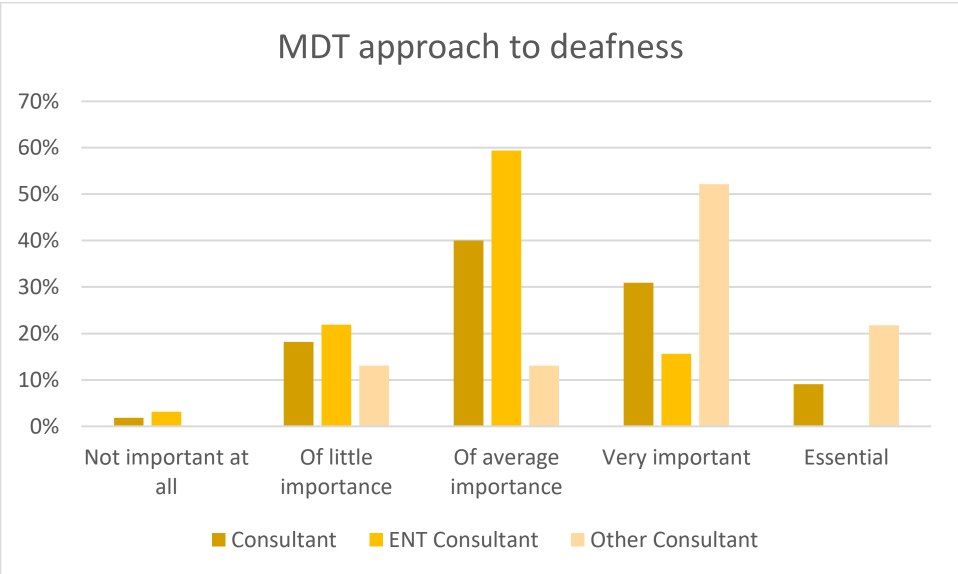

Figure 52: Bar chart showing responses for the multidisciplinary approach to deafness with the consultant group split for otolaryngology versus non-otolaryngology consultants

Post hoc analysis revealed no significant inter group differences for the importance of voice in verbal and non-verbal communication.

Post hoc analysis of communication with laryngectomees showed statistically significant differences between consultants and foundation year doctors (*p*=<.001). The mode response from all groups indicated that this was a topic of average importance, except foundation year doctors who were more likely to rate it as very important (*Figure 53*).

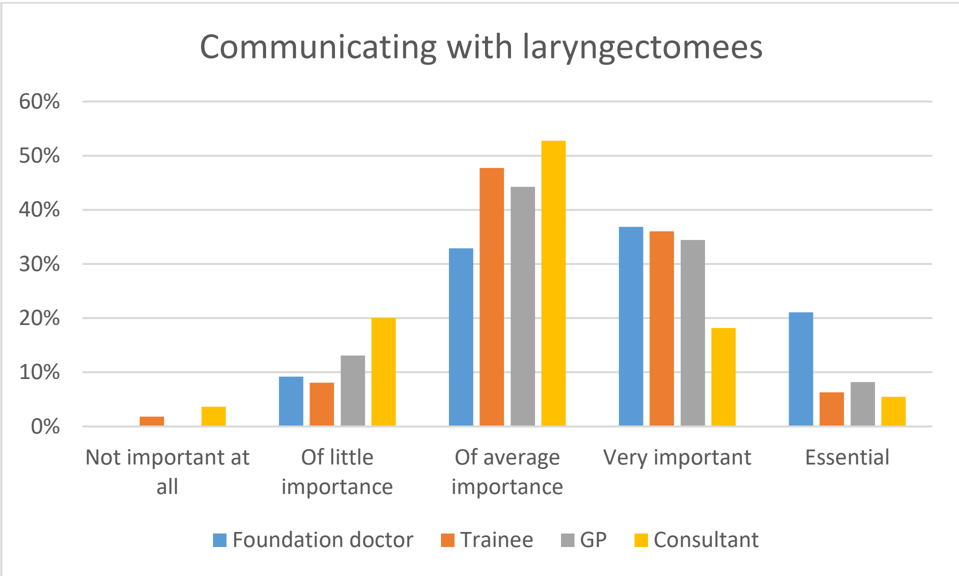

Figure 53: Bar chart showing responses for communication with laryngectomees by current post of the participant

Post hoc analysis of the multidisciplinary approach to voice disorders showed statistically significant differences between consultants and specialty trainees (*p*=.023), consultants and general practitioners (*p*=.004) and consultants and foundation year doctors (*p*=.001). Despite these statistical differences, the mode response from all groups was that this was a topic of average importance (*Figure 54*).

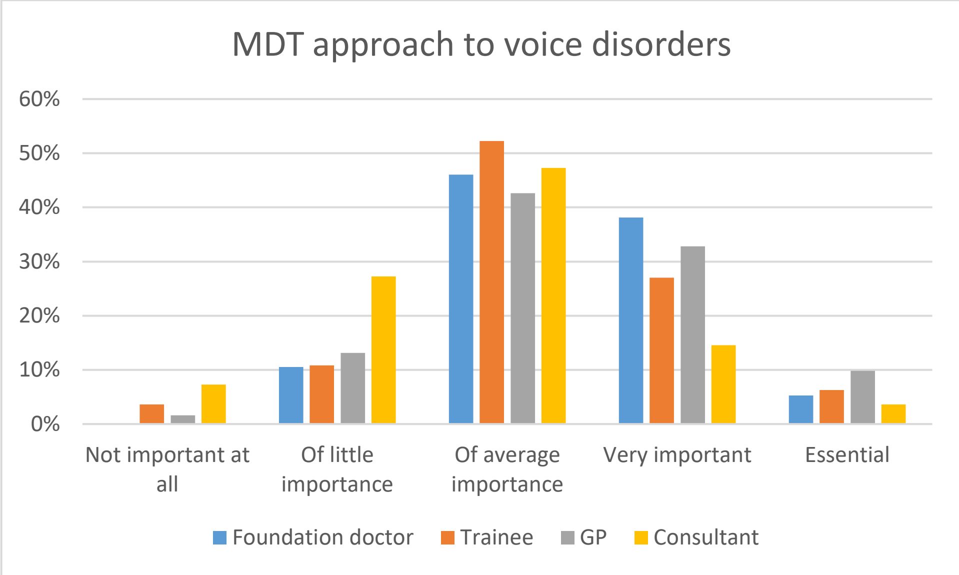

Figure 54: Bar chart showing responses for voice disorders by current post of the participant

Post hoc analysis of behavioural and psychological factors which may contribute to ENT conditions showed statistically significant differences between consultants and general practitioners (p=.015) and specialty trainees and general practitioners (p=.047). The mode response from all groups rated this as a topic of average importance, except for general practitioners who were more likely to indicate that it was a very important topic (*Figure 55*).

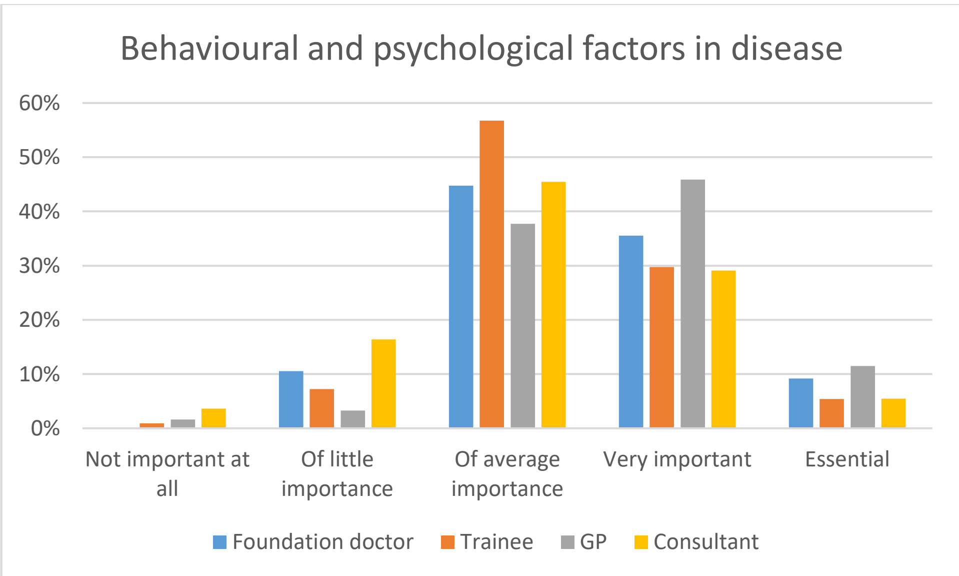

Figure 55: Bar chart showing responses for behavioural and psychological factors in disease by current post of the participant

Clinical conditions

Otology

Twenty eight otology topics were asked about in the questionnaire. Statistically significant differences were seen between groups in 27 of the 28 (*Table 39*). Post hoc analysis was undertaken using the same principles as previously stated.

Table 39: Otology topics

	Otology topics	Distribution	H test	*p*-value
1	Ototoxicity	Not similar	26.618	<.001
2	Otosclerosis	Not similar	20.494	<.001
3	Presbyacusis	Not similar	6.810	.078
4	Noise induced hearing loss	Not similar	11.078	.011
5	Congenital hearing loss	Similar	12.931	.005
6	Conductive hearing loss	Not similar	13.882	.003
7	Sensorineural hearing loss	Not similar	11.839	.008
8	Auditory Processing Disorder	Not similar	13.198	.004
9	Vestibular neuritis / Labyrinthitits	Not similar	15.139	.002
10	Meniere's Disease	Not similar	35.901	<.001
11	Benign Paroxysmal Positional Vertigo	Not similar	25.054	<.001
12	Vestibular Migraine	Not similar	11.995	.007
13	Presbystasis	Not similar	11.839	.008
14	Complications of middle ear disease	Not similar	21.703	<.001
15	Acute otitis media	Not similar	25.985	<.001
16	Chronic otitis media (including cholesteatoma)	Not similar	48.725	<.001
17	Chronic otitis media with effusion	Similar	26.510	<.001
18	Otitis externa	Not similar	30.425	<.001
19	Mastoiditis	Not similar	29.215	<.001
20	Aural granulations / polyps	Not similar	9.019	.029
21	Vestibular schwannoma	Not similar	20.289	<.001
22	Barotrauma	Not similar	10.449	.015
23	Eustachian tube dysfunction	Not similar	29.416	<.001
24	Facial palsy	Similar	8.887	.031
25	Tympanic membrane perforation	Not similar	20.042	<.001
26	Tinnitus	Not similar	20.427	<.001
27	Tympanosclerosis	Not similar	10.863	.012
28	Chondrodermatitis nodularis helicis	Not similar	19.093	<.001

Post hoc analysis of ototoxicity showed statistically significant differences between consultants and foundation year doctors (p=<.001), specialty trainees and foundation year doctors (p=.001) and general practitioners and foundation year doctors (p=.024). The mode response from all groups except foundation year doctors was that students should be aware of this condition. The mode response from foundation year doctors was that students should be able to take a history and examine a patient with ototoxicity (*Figure 56*).

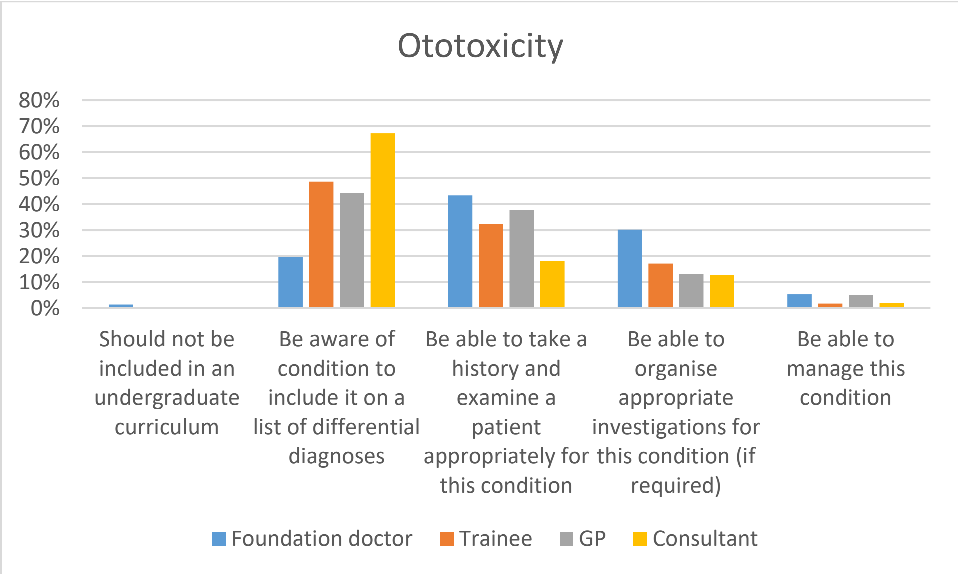

Figure 56: Bar chart showing responses for ototoxicity by current post of the participant

Post hoc analysis of otosclerosis showed statistically significant differences between consultants and general practitioners (p=.001) and consultants and foundation year doctors (p=<.001). Despite these differences, the mode response from all groups was that students should simply be aware of the condition (*Figure 57*).

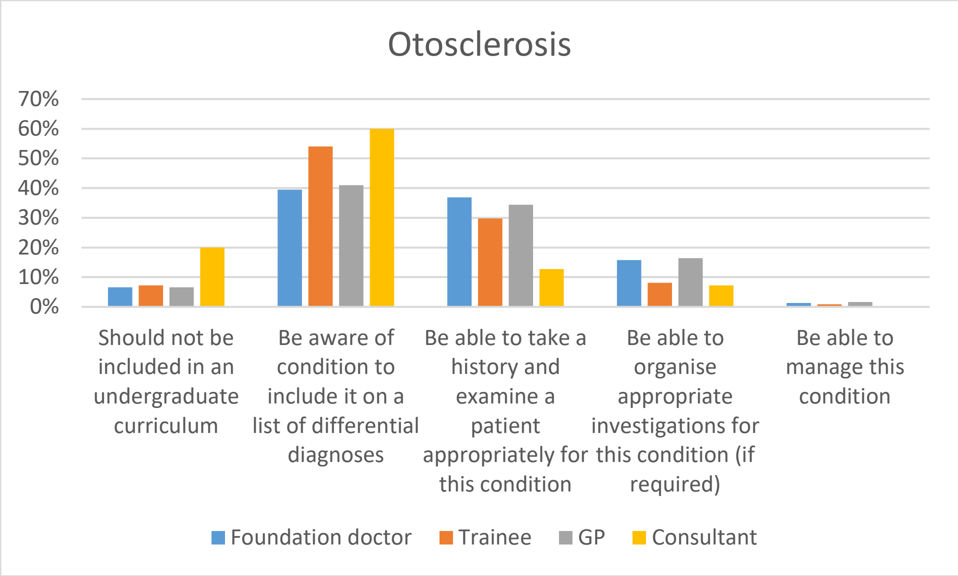

Figure 57: Bar chart showing responses for otosclerosis by current post of the participant

Post hoc analysis of noise induced hearing loss showed statistically significant differences between consultants and foundation year doctors (*p*=.041) and consultants and general practitioners (*p*=.024). The majority of consultants felt that students should simply be aware of this condition, with the mode response for specialty trainees being the same. Foundation year doctors indicated that they felt that students should be able to take a history and examine a patient with noise induced hearing loss. Responses from general practitioners were mixed and showed a spread of responses up to being able to organise appropriate investigations (*Figure 58*).

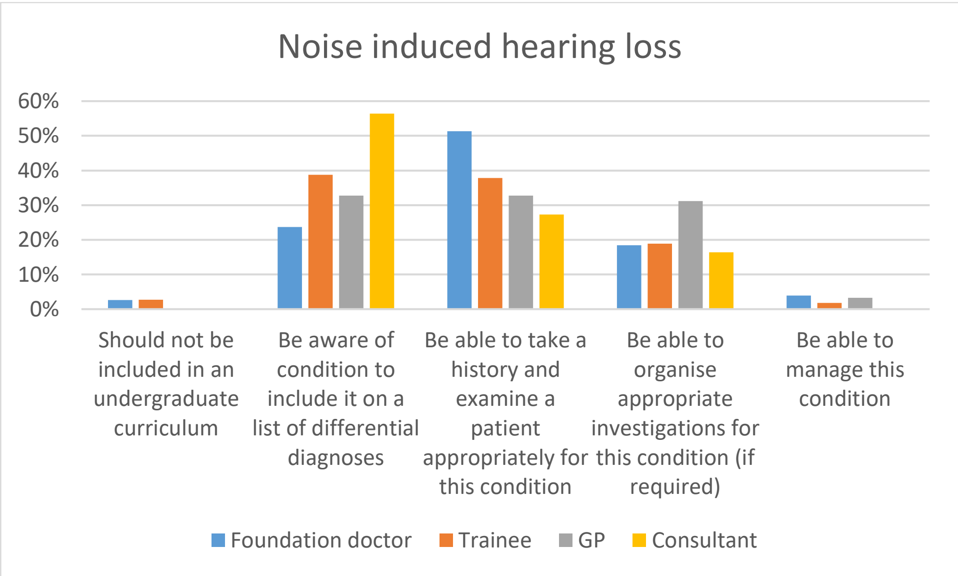

Figure 58: Bar chart showing responses for noise induced hearing loss by current post of the participant

Post hoc analysis of congenital hearing loss showed statistically significant differences between consultants and foundation year doctors (*p*=.002). The mode response for all groups except foundation year doctors was for students to be aware of congenital hearing loss. Foundation year doctors, however, were more likely to indicate that they felt that students should be able to take a history and examine a patient for this condition (*Figure 59*).

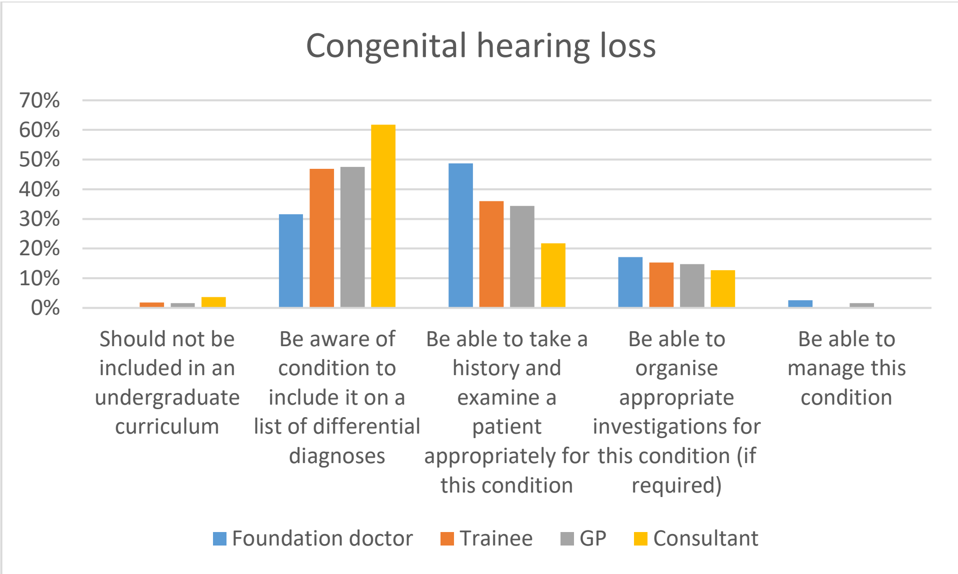

Figure 59: Bar chart showing responses for congenital hearing loss by current post of the participant

Post hoc analysis of conductive hearing loss showed statistically significant differences between consultants and specialty trainees (*p*=.045) and consultants and foundation year doctors (*p*=.01). Despite this, the mode response for all groups was that students should be able to take a history and examine patients for conductive hearing loss (*Figure 60*).

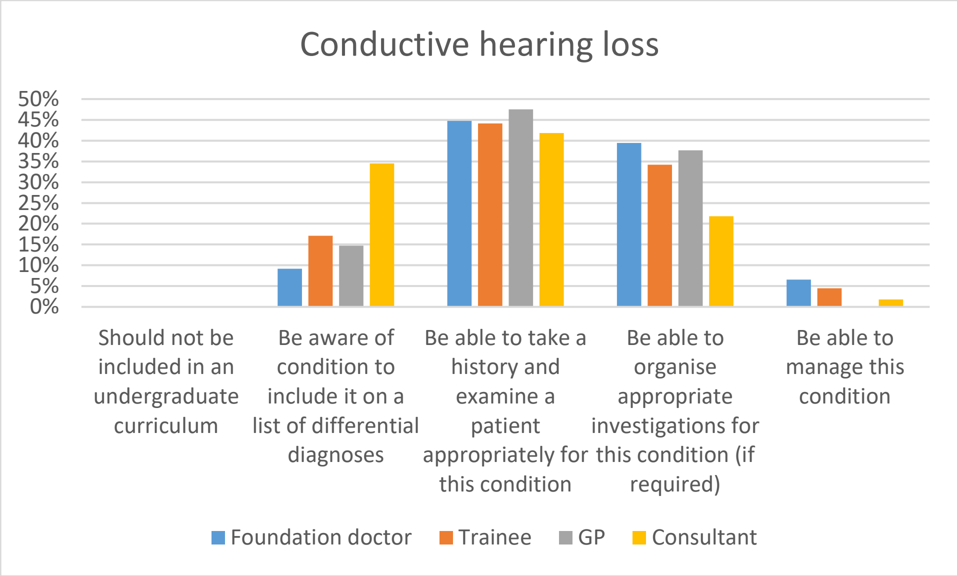

Figure 60: Bar chart showing responses for conductive hearing loss by current post of the participant

Post hoc analysis of sensorineural hearing loss showed statistically significant differences between consultants and general practitioners (p=.022) and consultants and foundation year doctors (p=.01). *Figure 61* illustrates that the mode response from general practitioners indicated that students should be able to organise appropriate investigations for sensorineural hearing loss whilst the other groups' mode response was that students should be able to take a history and examine these patients.

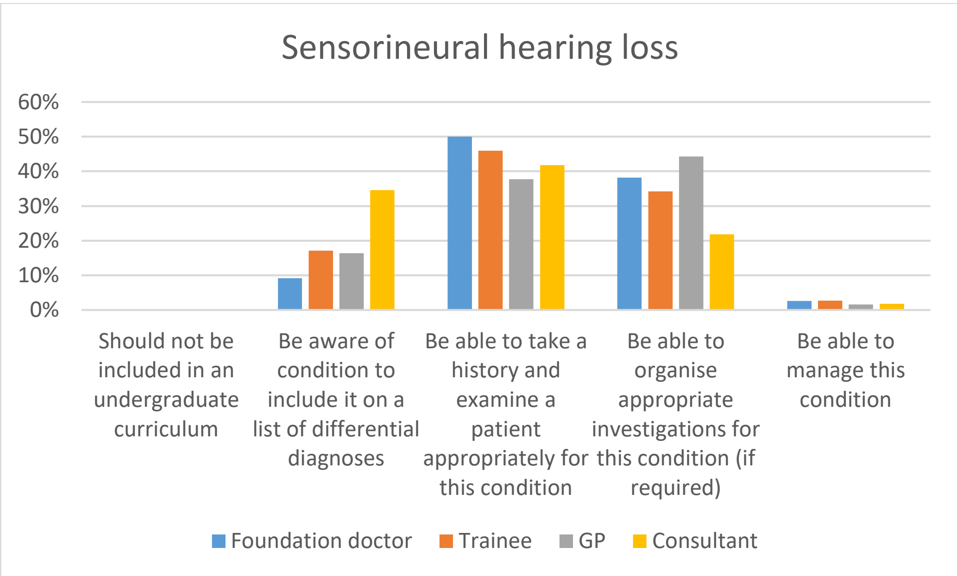

Figure 61: Bar chart showing responses for sensorineural hearing loss by current post of the participant

Post hoc analysis of auditory processing disorder showed statistically significant differences between consultants and foundation year doctors (p=.002). The mode response from all groups was for students to have an awareness of this condition (*Figure 62*).

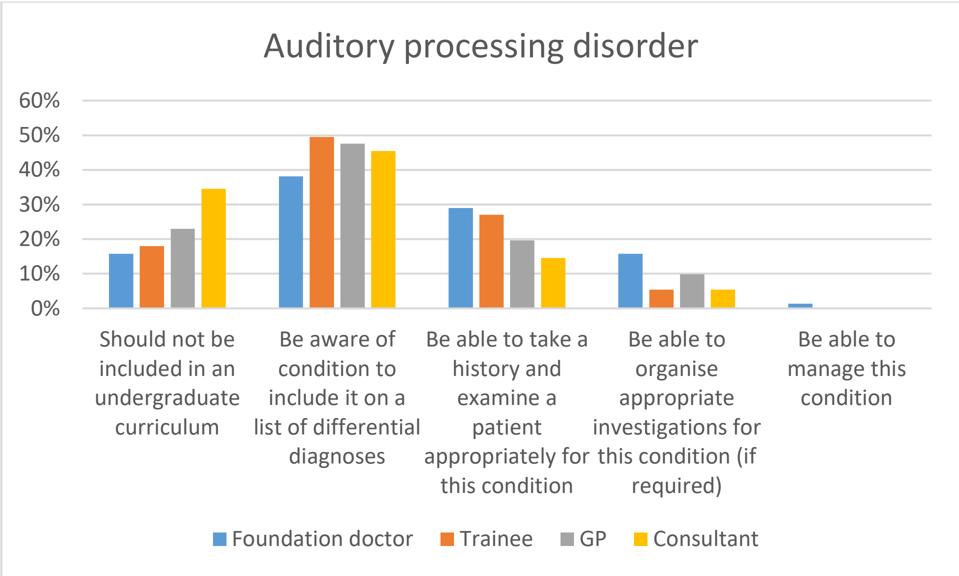

Figure 62: Bar chart showing responses for auditory processing disorder by current post of the participant

Post hoc analysis of vestibular neuritis/ labyrinthinitis showed statistically significant differences between and consultants and foundation year doctors (p=.007) and consultants and general practitioners (p=.002). There was a stark difference in mode responses between groups with general practitioners indicating a higher level of performance for students, particularly compared to consultants (*Figure 63*).

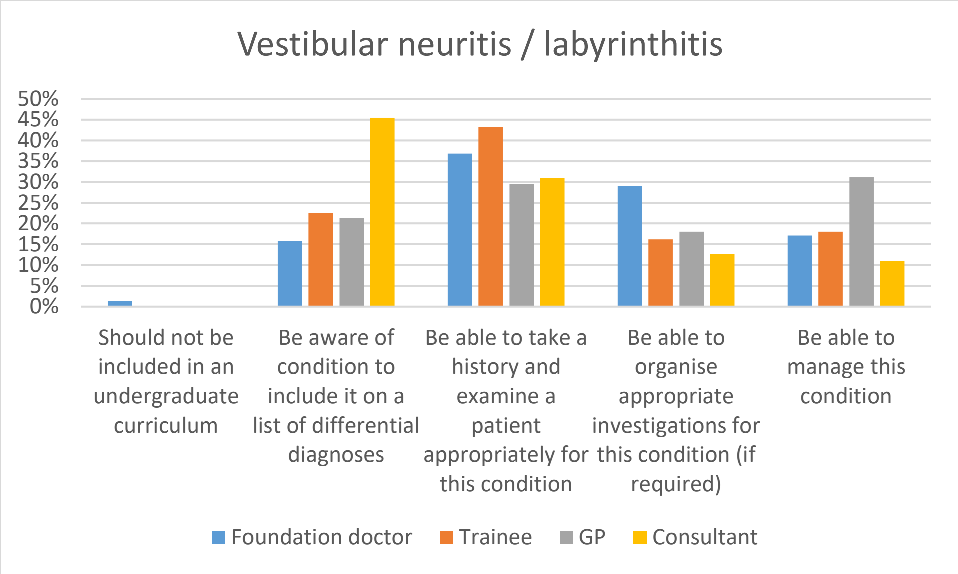

Figure 63: Bar chart showing responses for vestibular neuritis/ labyrinthitis by current post of the participant

Post hoc analysis of Meniere's disease showed statistically significant differences between consultants and specialty trainees (p=<.001), consultants and general practitioners (p=<.001) and consultants and foundation year doctors (p=<.001). The distribution of responses is seen in *Figure 64*. A spread of responses was seen from all groups except consultants, who were more likely to indicate a lower level of performance.

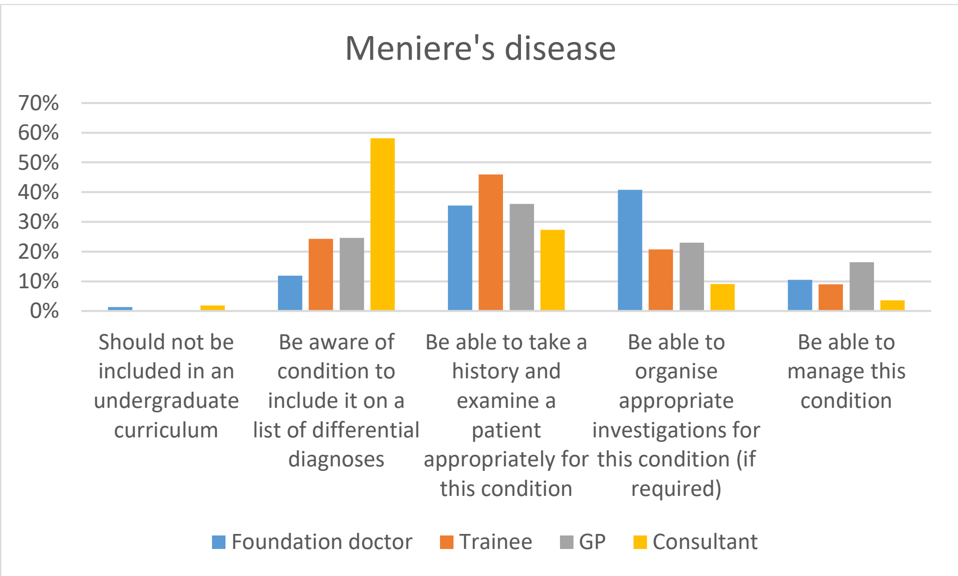

Figure 64: Bar chart showing responses for Meniere's disease by current post of the participant

Post hoc analysis of Benign Paroxysmal Positional Vertigo showed statistically significant differences between consultants and specialty trainees (*p*=.001), consultants and general practitioners (*p*=.001) and consultants and foundation year doctors (*p*=<.001). A similar trend as was seen with the responses to Meniere's disease was seen for benign paroxysmal positional vertigo (*Figure 65*).

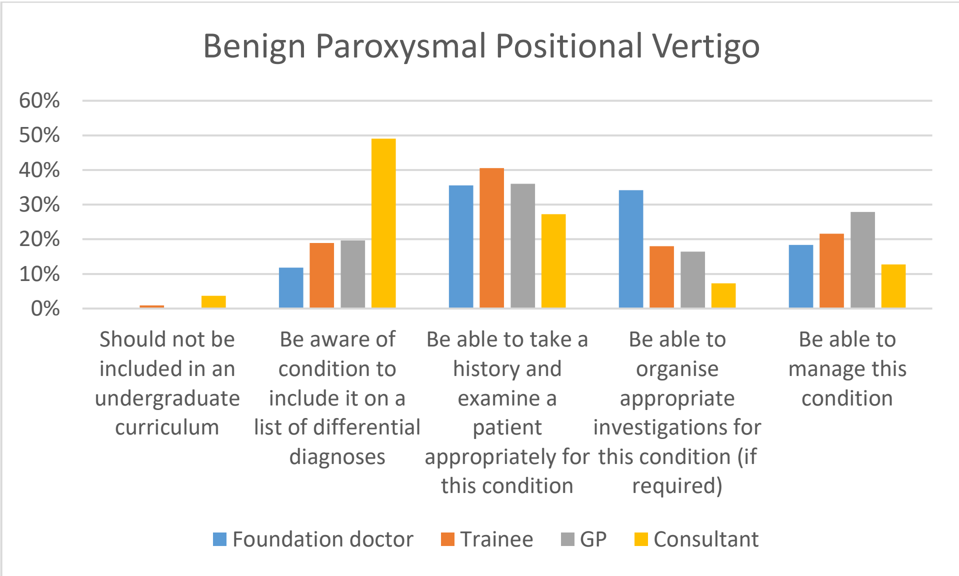

Figure 65: Bar chart showing responses benign paroxysmal positional vertigo by current post of the participant

Post hoc analysis of vestibular migraine showed statistically significant differences between consultants and foundation year doctors (*p*=.003). Foundation year doctors were again more likely to indicate a higher level of performance (*Figure 66*).

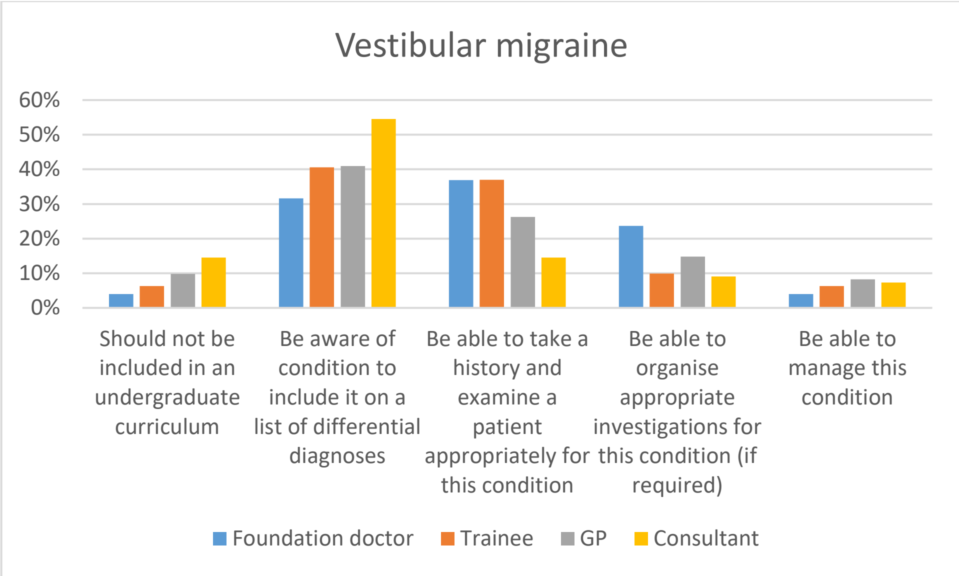

Figure 66: Bar chart showing responses for vestibular migraine by current post of the participant

Post hoc analysis of presbyastasis showed statistically significant differences between consultants and foundation year doctors (*p*=.004). The mode response for all groups was for students to be aware of this condition (*Figure 67*).

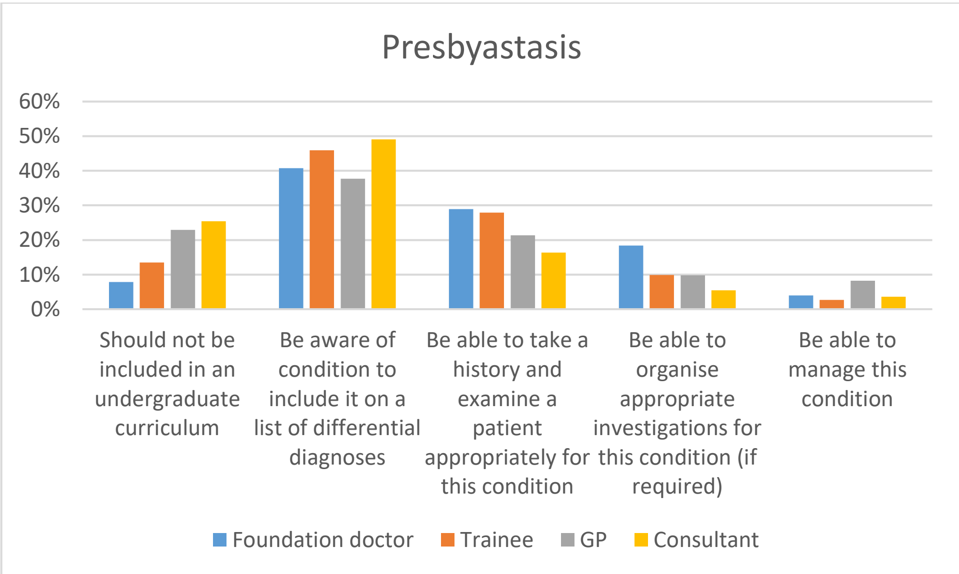

Figure 67: Bar chart showing responses for presbyastasis by current post of the participant

Post hoc analysis of complications of middle ear disease showed statistically significant differences between consultants and general practitioners (*p*=.002), consultants and foundation year doctors (*p*=<.001) and specialty trainees and foundation year doctors (*p*=.041). Consultants, again, tended to indicate a lower level of performance than the other groups (*Figure 68*).

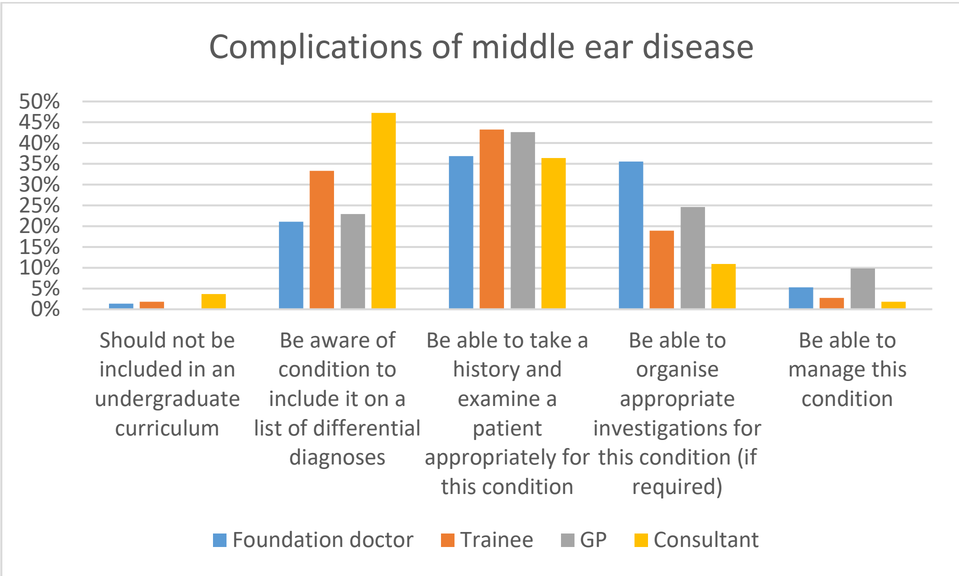

Figure 68: Bar chart showing responses for complications of middle ear disease by current post of the participant

Post hoc analysis of acute otitis media showed statistically significant differences between and consultants and foundation year doctors (*p*=<.001) and consultants and general practitioners (*p*=<.001). The mode response from all groups was that students should be able to manage this condition, but *Figure 69* shows that responses from consultants were more spread than the other groups. This is seen for both otolaryngology and non-otolaryngology consultants (*Figure 70*).

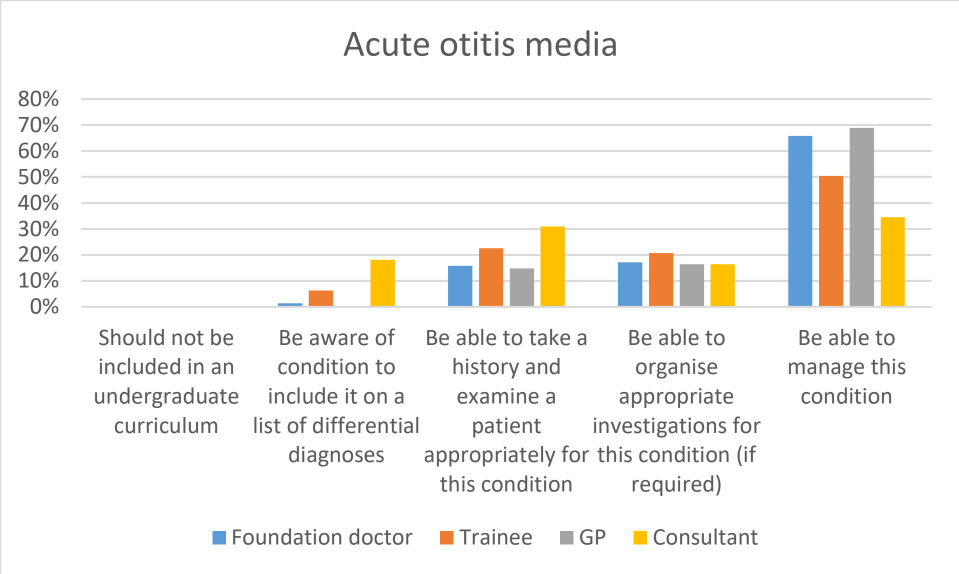

Figure 69: Bar chart showing responses for acute otitis media by current post of the participant

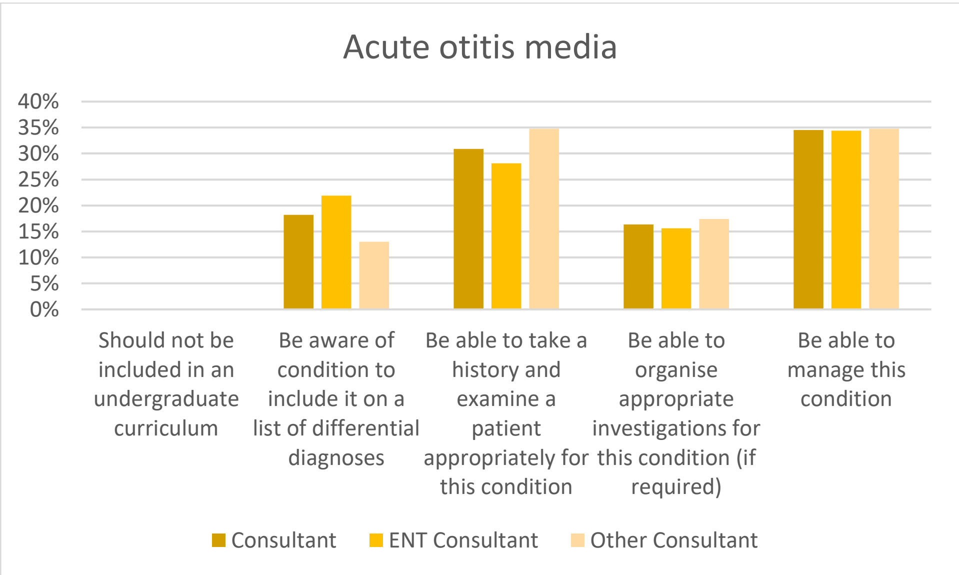

Figure 70: Bar chart showing responses for acute otitis media with the consultant group split for otolaryngology versus non-otolaryngology consultants

Post hoc analysis of chronic otitis media showed statistically significant differences between consultants and specialty trainees (p=<.001), consultants and general practitioners (p=<.001) and consultants and foundation year doctors (p=<.001). The mode response for consultants would indicate that students should be aware of this condition but *Figure 71* shows that there was a spread of responses and that other groups tended towards a higher level of performance.

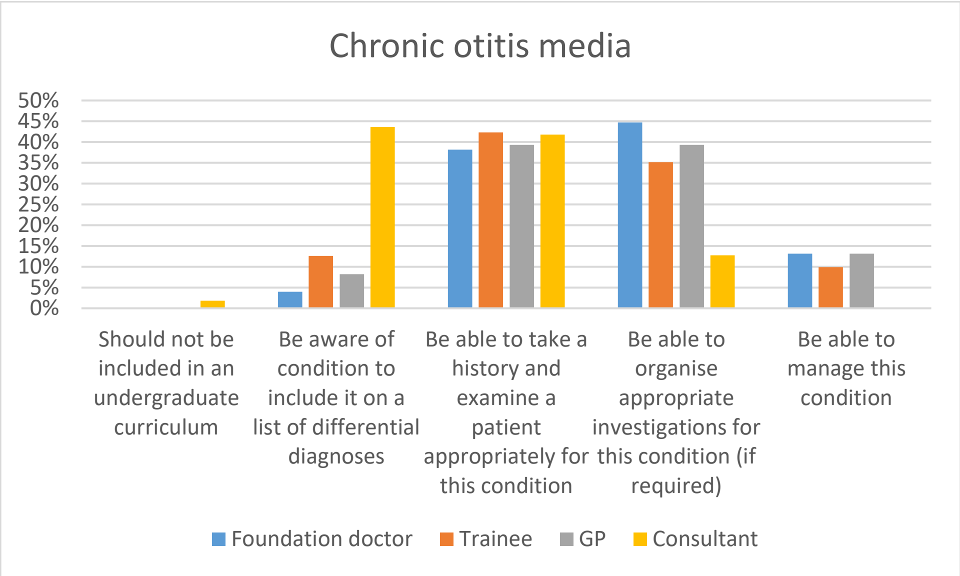

Figure 71: Bar chart showing responses for chronic otitis media by current post of the participant

Post hoc analysis of chronic otitis media with effusion showed statistically significant differences between consultants and general practitioners (*p*=.008), consultants and specialty trainees (*p*=.001) and consultants and foundation year doctors (*p*=<.001). The mode response from consultants, general practitioners and specialty trainees was for students to be able to take a history and examine patients with this condition (*Figure 72*). Foundation year doctors tended to indicate a higher level of performance.

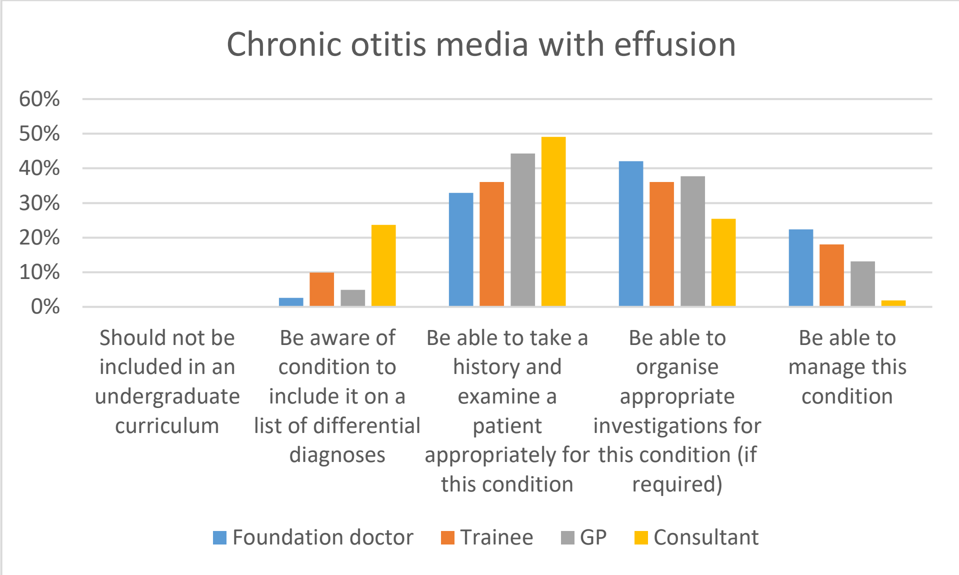

Figure 72: Bar chart showing responses for chronic otitis media with effusion by current post of the participant

Post hoc analysis of otitis externa showed statistically significant differences between consultants and specialty trainees (*p*=.011), consultants and general practitioners (*p*=<.001), consultants and foundation year doctors (*p*=<.001) and specialty trainees and foundation year doctors (*p*=.044). The mode response from all groups indicated that students should be able to manage this condition except for consultants (*Figure 73*). *Figure 74* shows that it was the otolaryngology consultants who tended to favour the lower level of performance.

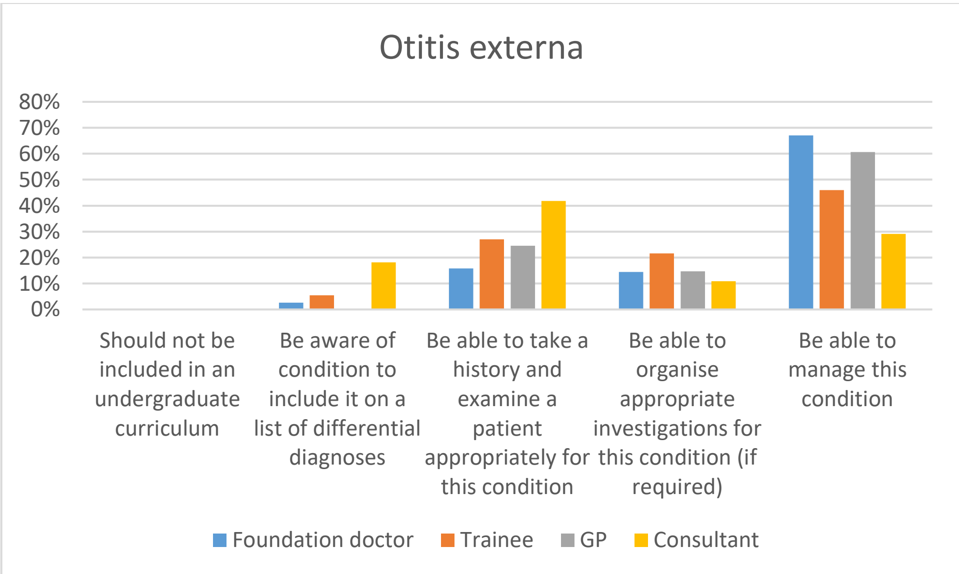

Figure 73: Bar chart showing responses for otitis externa by current post of the participant

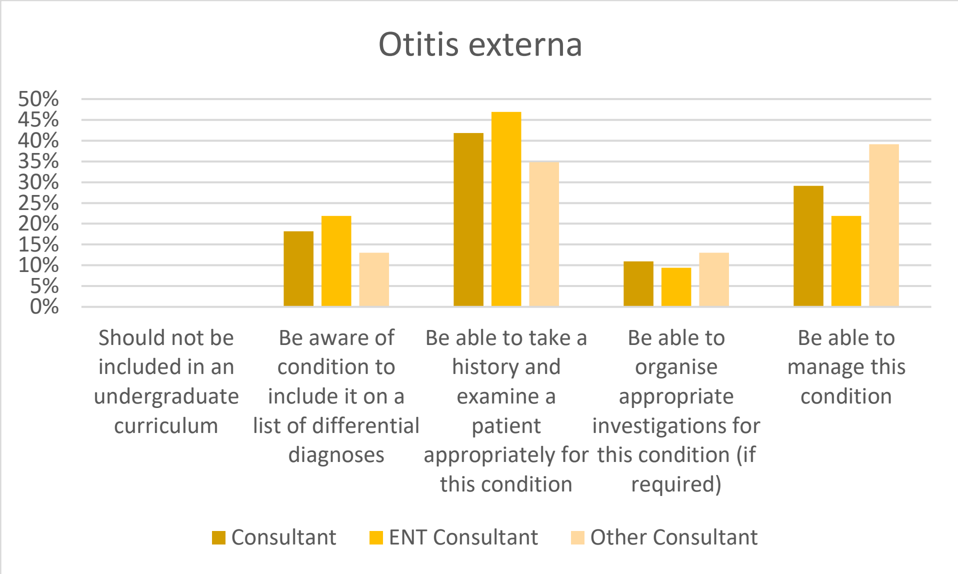

Figure 74: Bar chart showing responses for otitis externa with the consultant group split for otolaryngology versus non-otolaryngology consultants

Post hoc analysis of mastoiditis showed statistically significant differences between consultants and specialty trainees (p=.002), consultants and general practitioners (p=<.001) and consultants and foundation year doctors (p=<.001). Again, foundation year doctors tended to favour a higher level of performance, with consultants favouring a lower level of performance (*Figure 75*).

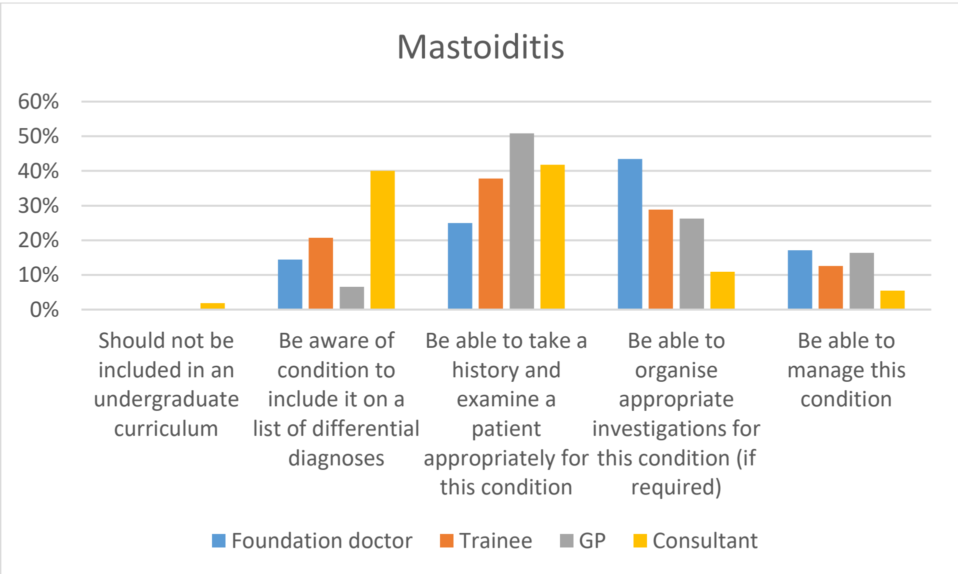

Figure 75: Bar chart showing responses for mastoiditis by current post of the participant

Post hoc analysis revealed no significant inter group differences for aural granulations and polyps.

Post hoc analysis of vestibular schwannoma showed statistically significant differences between consultants and foundation year doctors (p=<.001) and general practitioners and foundation year doctors (p=.047). The mode response for all groups was an awareness of this condition (*Figure 76*).

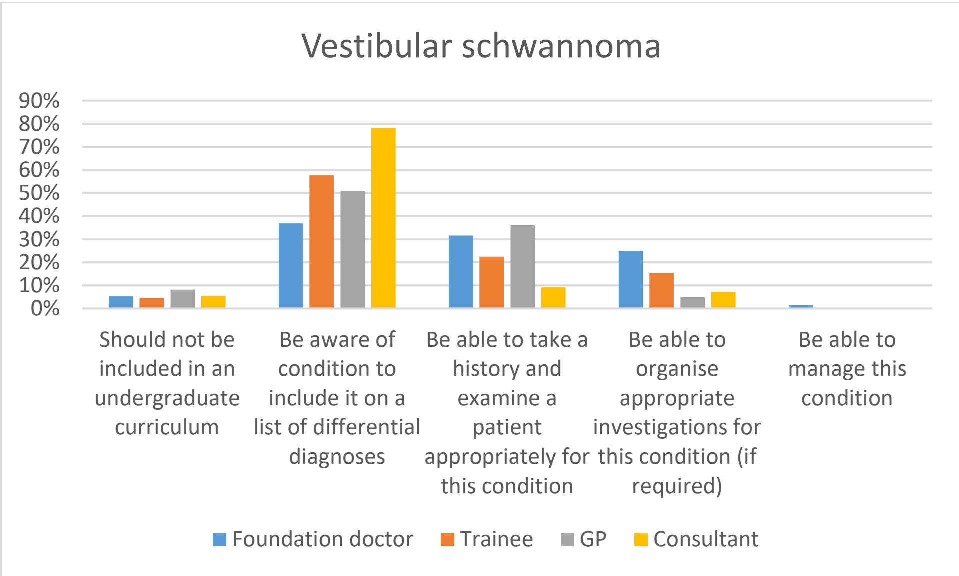

Figure 76: Bar chart showing responses for vestibular schwannoma by current post of the participant

Post hoc analysis of barotrauma showed statistically significant differences between consultants and foundation year doctors (p=.01). Again, the mode response for all groups was an awareness of this condition (*Figure 77*).

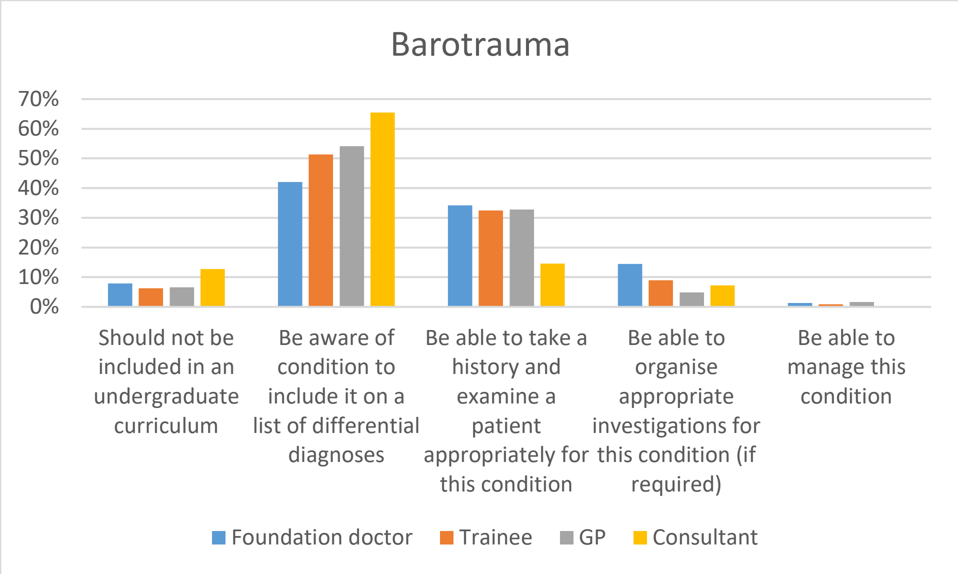

Figure 77: Bar chart showing responses for barotrauma by current post of the participant

Post hoc analysis of Eustachian tube dysfunction showed statistically significant differences between consultants and general practitioners (*p*=<.001), specialty trainees and general practitioners (*p*=<.001) and foundation year doctors and general practitioners (*p*=.036). For Eustachian tube dysfunction, consultants tended to favour a lower level of performance, whilst general practitioners were more split over the performance level (*Figure 78).*

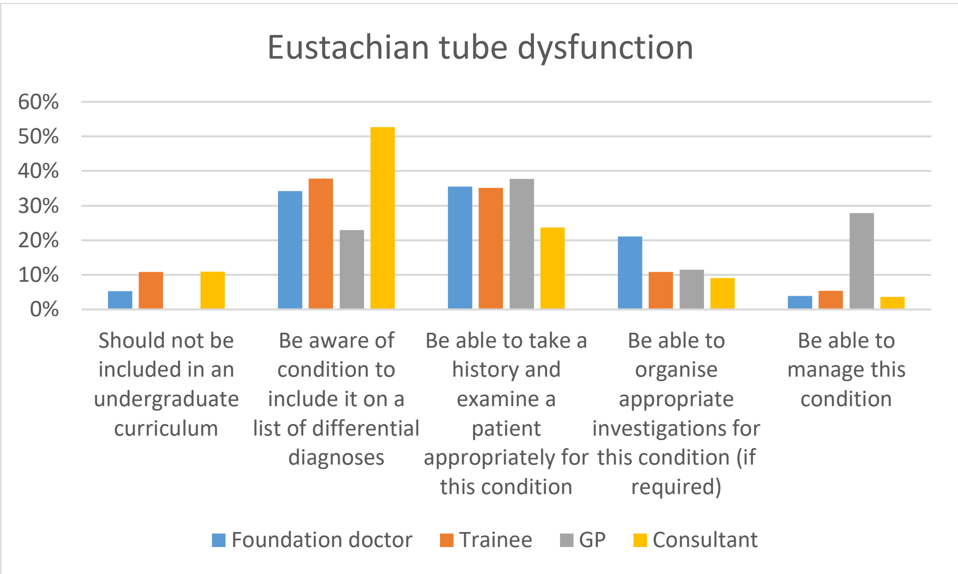

Figure 78: Bar chart showing responses Eustachian tube dysfunction by current post of the participant

Post hoc analysis of facial nerve palsy showed statistically significant differences between consultants and foundation year doctors (p=.018). The mode response for all groups except foundation year doctors was that students should be able to take a history and examine patients with facial nerve palsy. Foundation year doctors, however, tended to indicate a higher level of performance (*Figure 79*).

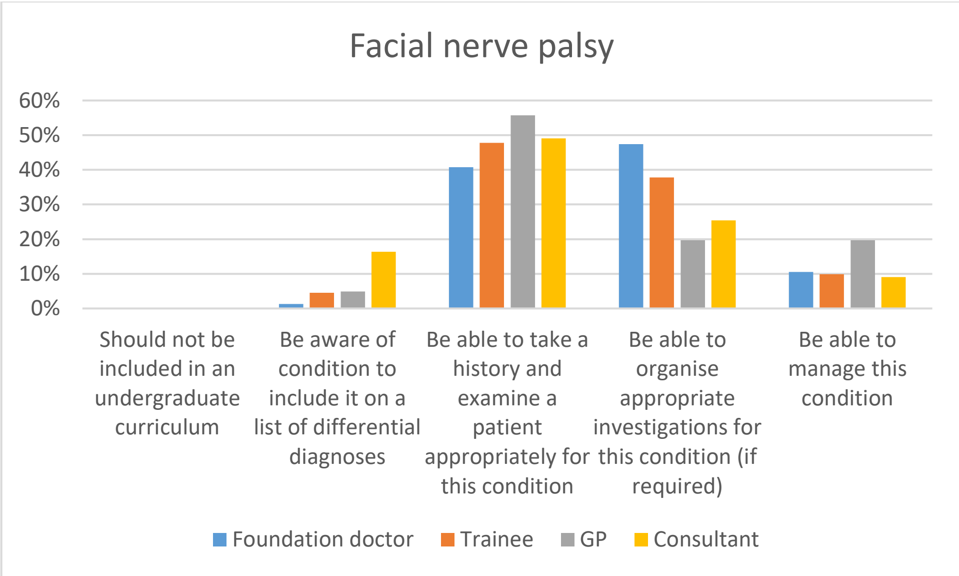

Figure 79: Bar chart showing responses for facial nerve palsy by current post of the participant

Post hoc analysis of tympanic membrane perforation showed statistically significant differences between consultants and specialty trainees (p=.012), consultants and foundation year doctors (p=.003) and consultants and general practitioners (p=<.001). The mode response from all groups was for students to be able to take a history and examine patients with a tympanic membrane perforation (*Figure 80*).

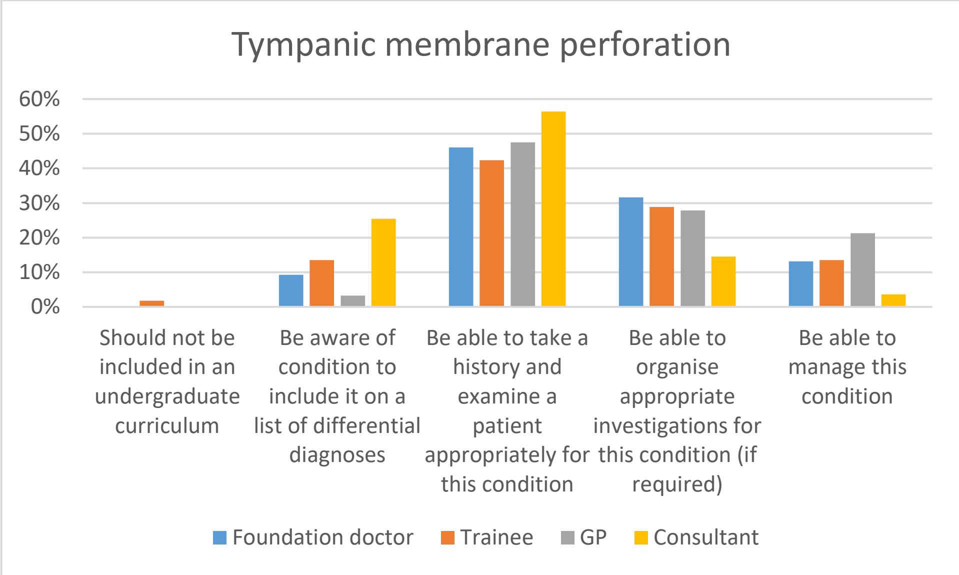

Figure 80: Bar chart showing responses for tympanic membrane perforation by current post of the participant

Post hoc analysis of tinnitus showed statistically significant differences between consultants and specialty trainees (*p*=.005), consultants and general practitioners (*p*=.001) and consultants and foundation year doctors (*p*=<.001). The consultant group were more likely to indicate that students should simply be aware of the condition, whereas the mode response from all of the other groups was for students to be able to take a history and examine these patients (*Figure 81*).

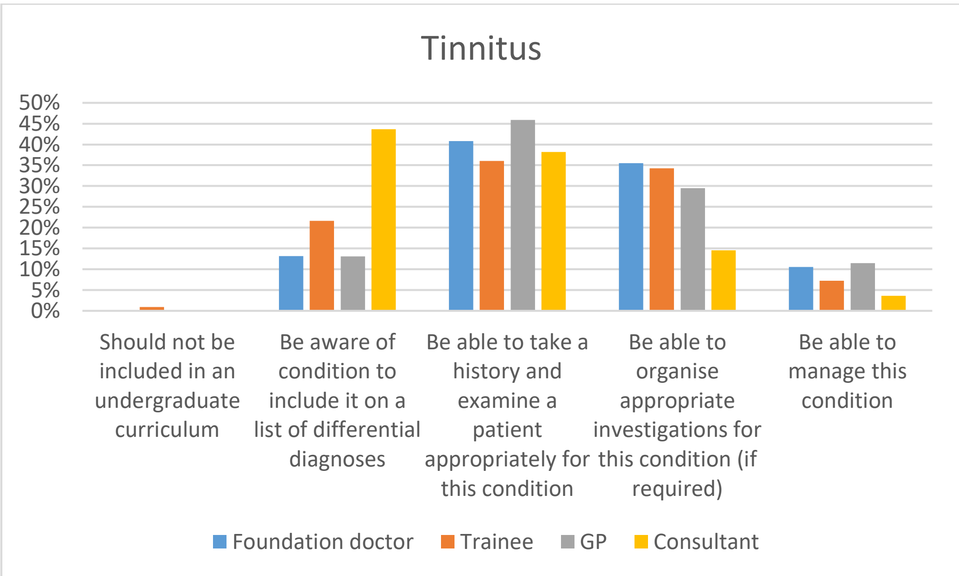

Figure 81: Bar chart showing responses for tinnitus by current post of the participant

Post hoc analysis of tympanosclerosis showed statistically significant differences between consultants and foundation year doctors (*p*=.024). The mode response from all groups except general practitioners was that students should be aware of this condition. The mode response from general practitioners was that students should be able to take a history and examine these patients (*Figure 82*).

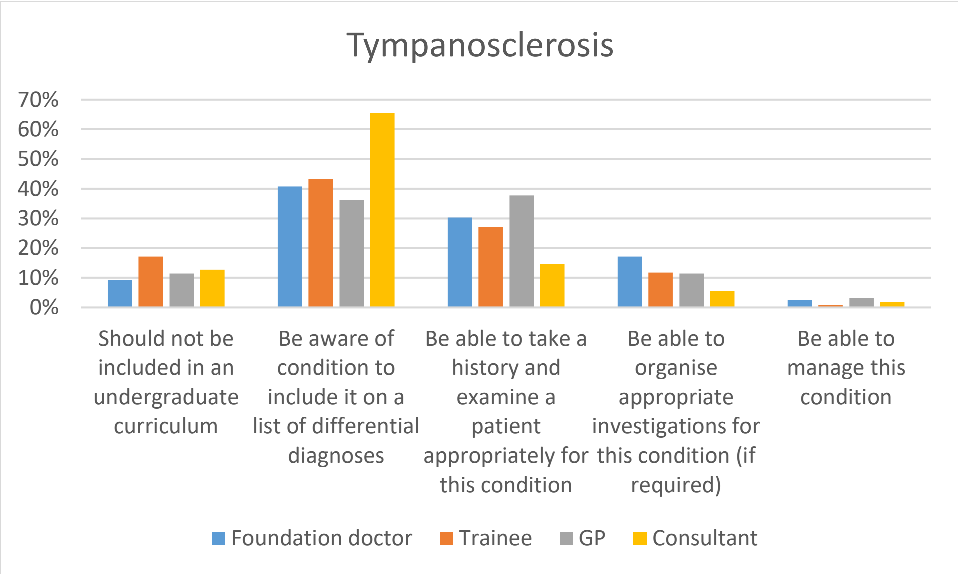

Figure 82: Bar chart showing responses for tympanosclerosis by current post of the participant

Post hoc analysis of chondrodermatitis nodularis helicis showed statistically significant differences between consultants and general practitioners (*p*=<.001) and specialty trainees and general practitioners (*p*=.005). An awareness of the condition was the mode response for all groups except consultants where the same percentage of consultants indicated that this condition should not be included within the curriculum (*Figure 83*).

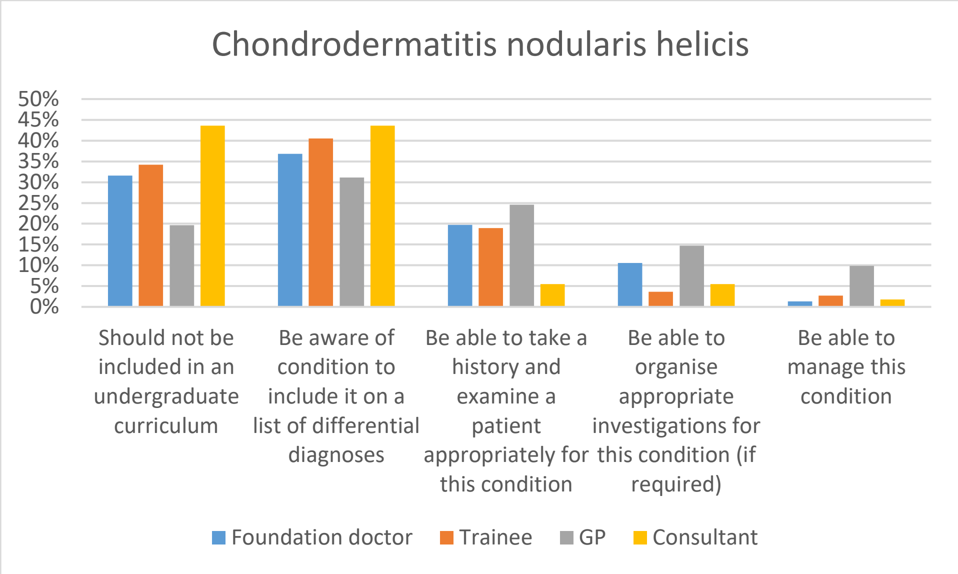

Figure 83: Bar chart showing responses for chondrodermatitis nodularis helicis by current post of the participant

Rhinology

Six rhinology topics were asked about in the questionnaire. Statistically significant differences were seen between groups for all rhinology topics (*Table 40*). Post hoc analysis was undertaken using the same principles as previously stated.

Table 40: Rhinology topics

	Rhinology topics	Distribution	H test	*p*-value
1	Allergic rhinitis	Similar	15.356	.002
2	Non-allergic rhinitis	Not similar	17.660	.001
3	Acute rhinosinusitis	Not similar	13.375	.004
4	Chronic rhinosinusitis (including polyps)	Not similar	28.188	<.001
5	Septal deviation	Not similar	17.838	<.001
6	Atypical facial pain	Not similar	29.066	<.001

Post hoc analysis of allergic rhinitis showed statistically significant differences between consultants and general practitioners (p=.021) and consultants and foundation year doctors (p=.01). Foundation year doctors and general practitioners were more likely to indicate a higher performance level, with consultants showing a spread across levels (*Figure 84*).

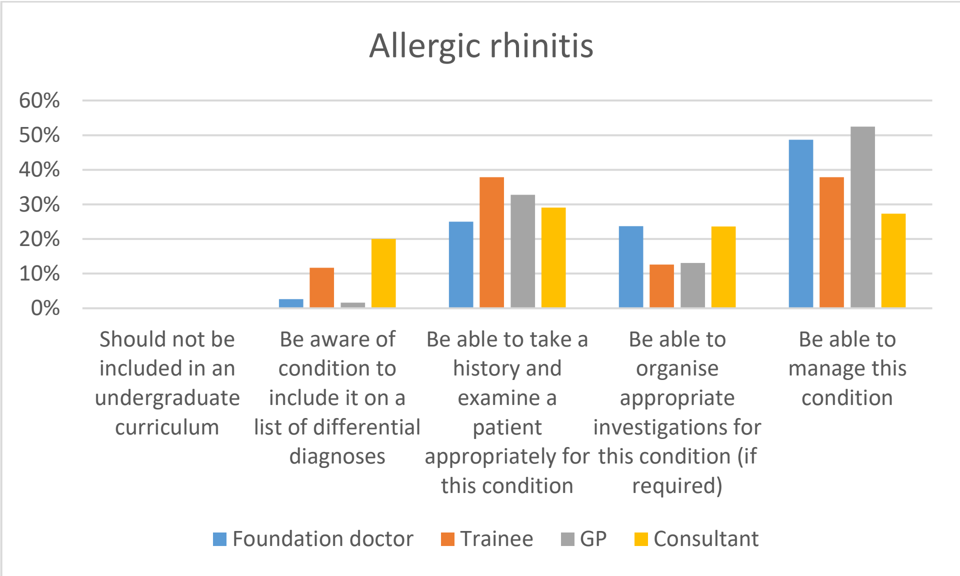

Figure 84: Bar chart showing responses for allergic rhinitis by current post of the participant

Post hoc analysis of non-allergic rhinitis showed statistically significant differences between consultants and foundation year doctors (p=.002) and consultants and general practitioners (p=.002). Again, general practitioners were more likely to respond that they felt that students should be able to manage this condition (*Figure 85*).

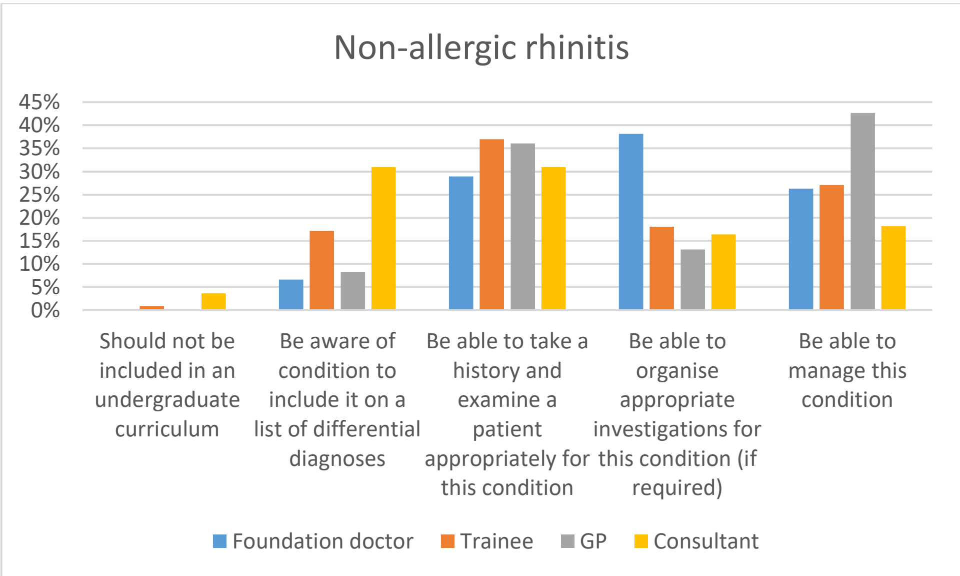

Figure 85: Bar chart showing responses non-allergic rhinitis by current post of the participant

Post hoc analysis of acute rhinosinusitis showed statistically significant differences between consultants and general practitioners (*p*=.017), specialty trainees and general practitioners (*p*=.005) and foundation year doctors and general practitioners (*p*=.045). The mode for general practitioners and consultants was that students should be able to manage acute rhinosinusitis, however, there was a spread of responses from consultants (*Figure 86*).

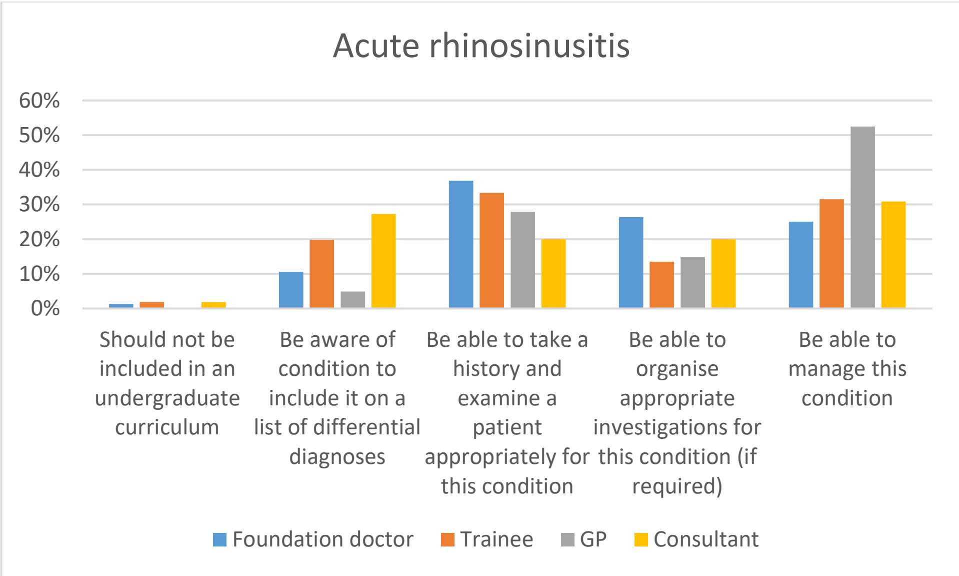

Figure 86: Bar chart showing responses acute rhinosinusitis by current post of the participant

Post hoc analysis of chronic rhinosinusitis (including polyps) showed statistically significant differences between consultants and foundation year doctors (*p*=.04), consultants and general practitioners (*p*=<.001), specialty trainees and foundation year doctors (*p*=.019) and specialty trainees and general practitioners (*p*=<.001). The mode for all groups was that students should be able to take a history and examine a patient with chronic rhinosinusitis (*Figure 87*).

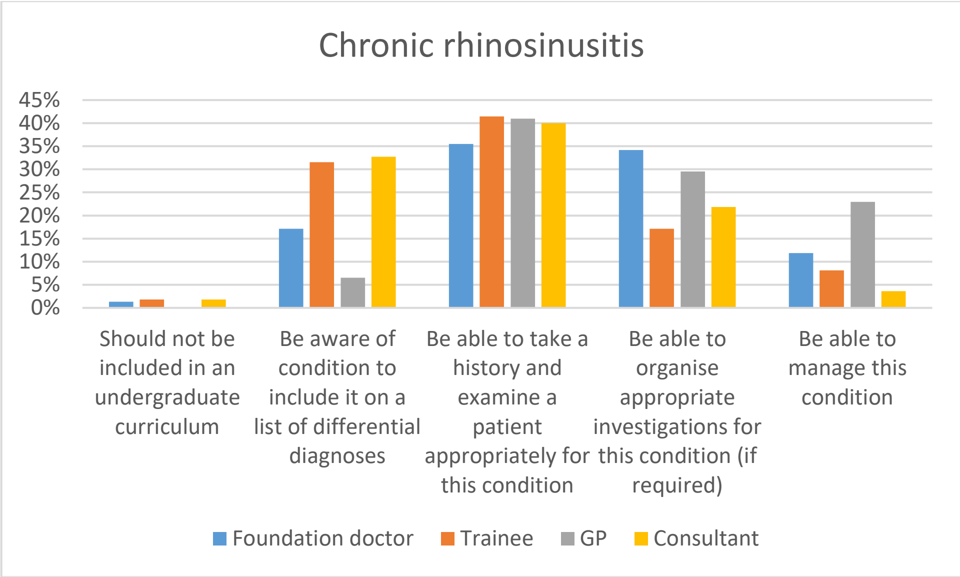

Figure 87: Bar chart showing responses chronic rhinosinusitis by current post of the participant

Post hoc analysis of septal deviation showed statistically significant differences between consultants and foundation year doctors (p=.048), consultants and general practitioners (p=.011), specialty trainees and foundation year doctors (p=.033) and specialty trainees and general practitioners (p=.006). Again, the mode for all groups showed that students should be able to take a history and examine patients with this condition (*Figure 88*).

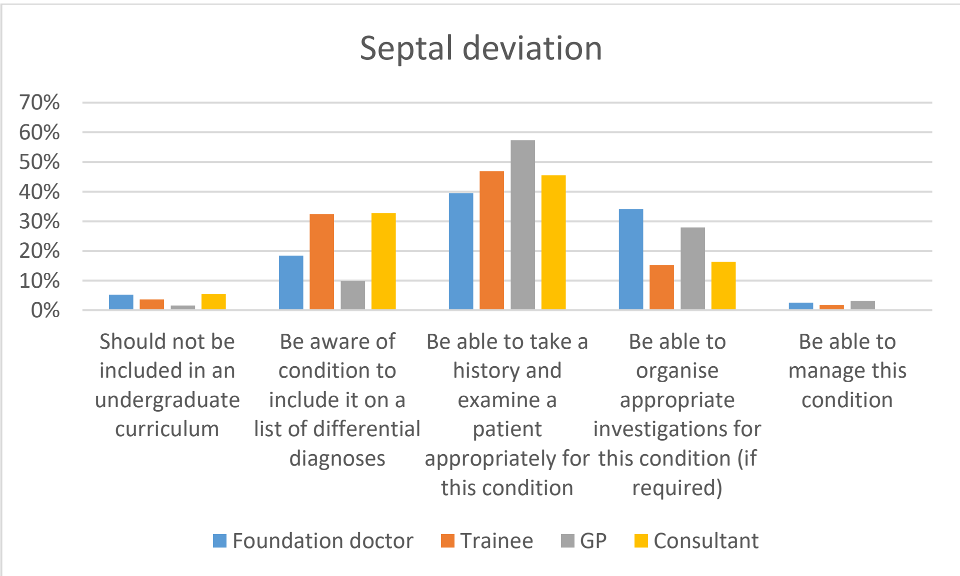

Figure 88: Bar chart showing responses for septal deviation by current post of the participant

Post hoc analysis of facial pain showed statistically significant differences between consultants and foundation year doctors (p=.003), consultants and general practitioners (p=<.001), specialty trainees and foundation year doctors (p=.006) and specialty trainees and general practitioners (p=<.001). *Figure 89* shows that the mode response from general practitioners and foundation year doctors was at a higher performance level than the other two groups.

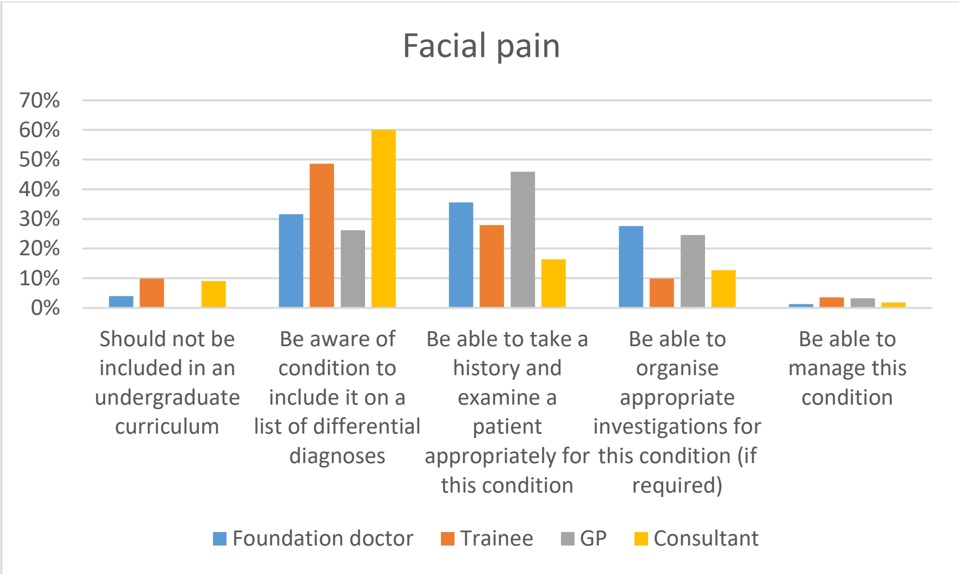

Figure 89: Bar chart showing responses for facial pain by current post of the participant

Laryngology/ other clinical conditions

Seventeen laryngology or other otolaryngology clinical conditions were asked about in the questionnaire. Statistically significant differences were seen between groups in 16 of the 17 (*Table 41*). Post hoc analysis was undertaken using the same principles as previously stated.

Table 41: Laryngology and other clinical conditions

	Other clinical conditions	Distribution	H test	*p*-value
1	Benign vocal cord lesions	Similar	8.988	.029
2	Laryngeal papillomatosis	Not similar	4.558	.207
3	Laryngomalacia	Not similar	10.212	.017
4	Muscle tension dysphonia	Not similar	12.505	.006
5	Vocal cord palsy	Similar	13.246	.004
6	Laryngitis	Not similar	39.138	<.001
7	Epiglottitis	Not similar	34.170	<.001
8	Croup	Not similar	25.136	<.001
9	Salivary gland disorders	Not similar	14.253	.003
10	Thyroid disorders	Not similar	31.239	<.001
11	Thyroglossal duct cyst	Not similar	10.662	.014
12	Branchial cyst	Not similar	8.528	.036
13	Pharyngeal pouch	Not similar	21.479	<.001
14	Obstructive sleep apnoea	Not similar	33.283	<.001
15	Globus pharyngeus	Not similar	14.798	.002
16	Laryngopharyngeal reflux	Not similar	23.697	<.001
17	Pharyngitis	Not similar	34.812	<.001

Post hoc analysis of benign vocal cord lesions showed statistically significant differences between specialty trainees and foundation year doctors (p=.044). The majority in all groups, except foundation year doctors, felt that students should be aware of these conditions in their list of differential diagnoses (*Figure 90*). Responses from foundation year doctors were more mixed but the mode response remained that students should be aware of this condition.

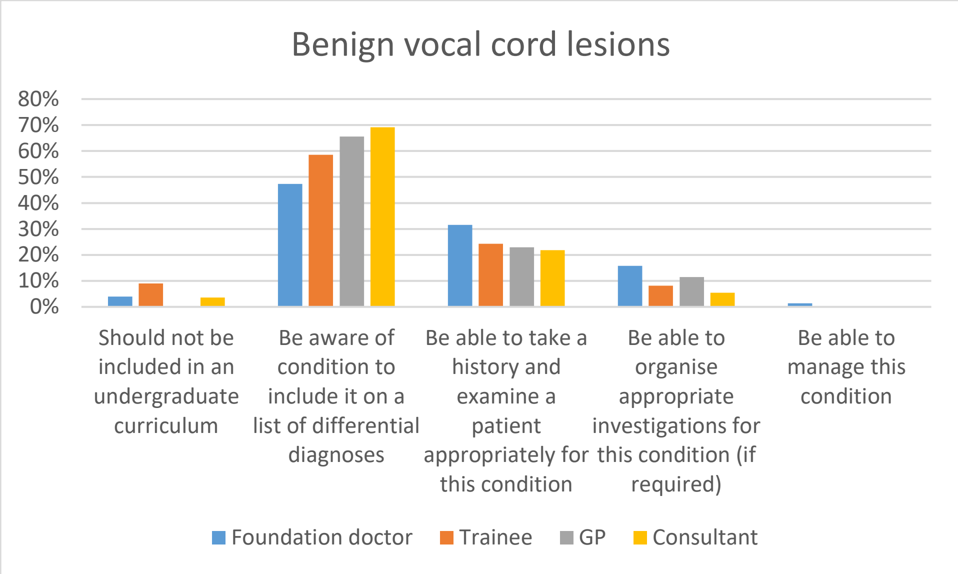

Figure 90: Bar chart showing responses for benign vocal cord lesions by current post of the participant

Post hoc analysis of laryngomalacia showed statistically significant differences between consultants and foundation year doctors (*p*=.027) and consultants and general practitioners (*p*=.034). Again, groups indicated that students should be aware of laryngomalacia (*Figure 91*).

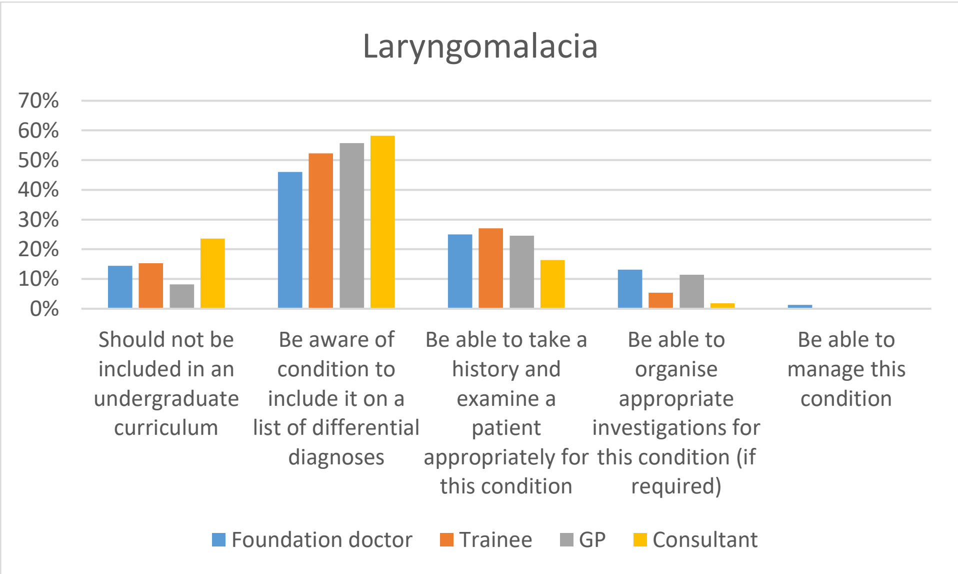

Figure 91: Bar chart showing responses for laryngomalacia by current post of the participant

Post hoc analysis of muscle tension dysphonia showed statistically significant differences between consultants and foundation year doctors (*p*=.008) and specialty trainees and foundation year doctors (*p*=.03). *Figure 92* shows the mode for all groups was for students to be aware of muscle tension dysphonia.

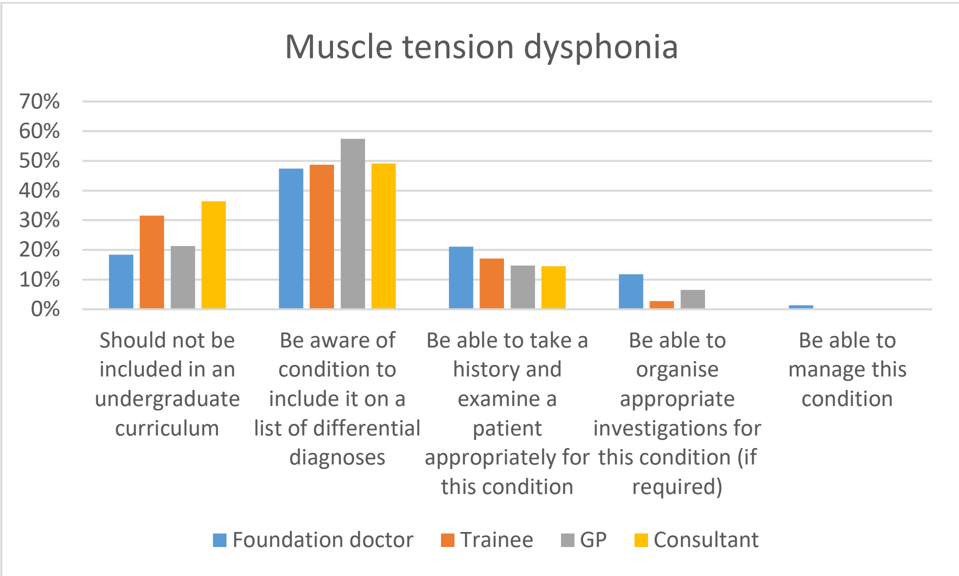

Figure 92: Bar chart showing responses for muscle tension dysphonia by current post of the participant

Post hoc analysis of vocal cord palsy showed statistically significant differences between consultants and foundation year doctors (*p*=.003) and specialty trainees and foundation year doctors (*p*=.05). The mode response from all groups was that students should be aware of vocal cord palsy apart from foundation year trainees where there was a split with responses indicating that students should be able to take a history and examine these patients (*Figure 93*).

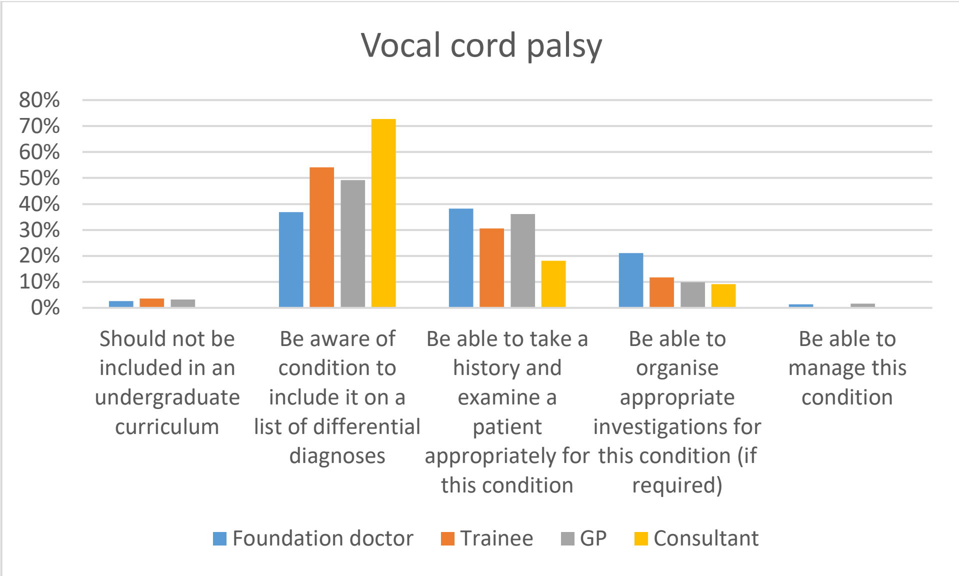

Figure 93: Bar chart showing responses for vocal cord palsy by current post of the participant

Post hoc analysis of laryngitis showed statistically significant differences between consultants and specialty trainees (*p*=.044), consultants and foundation year doctors (*p*=<.001), consultants and general practitioners (*p*=<.001), specialty trainees and foundation year doctors (*p*=.047) and specialty trainees and general practitioners (*p*=.001). For laryngitis, there was a stark contrast between the responses of consultants and general practitioners (*Figure 94*). General practitioners were more likely to indicate that they felt that students should be able to manage this condition by graduation, whereas consultants simply felt that they should be aware of it. *Figure 95* shows that this included both otolaryngology and non-otolaryngology consultants.

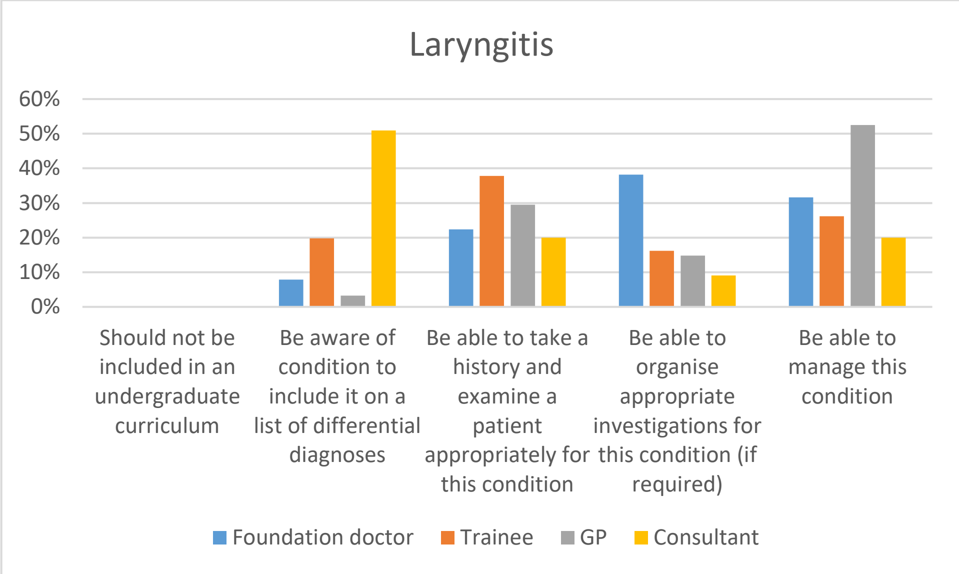

Figure 94: Bar chart showing responses for laryngitis by current post of the participant

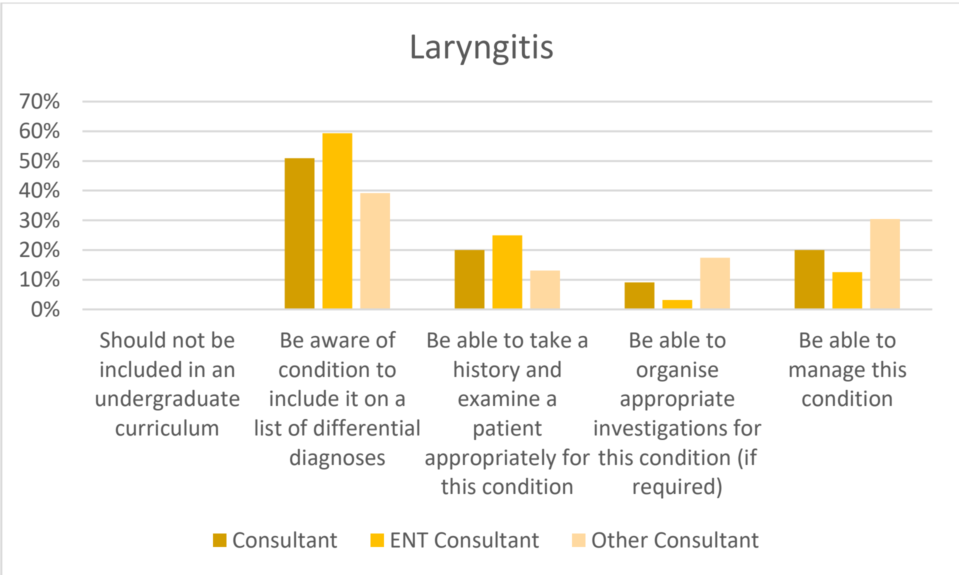

Figure 95: Bar chart showing responses for laryngitis with the consultant group split for otolaryngology versus non-otolaryngology consultants

Post hoc analysis of epiglottitis showed statistically significant differences between consultants and general practitioners (p=<.001), consultants and foundation year doctors (p=<.001), specialty trainees and general practitioners (p=.036) and specialty trainees and foundation year doctors (p=.002). Responses from each group were split across response options in relation to epiglottitis. General practitioners and foundation year doctors generally indicated a higher level of performance (*Figure 96*).

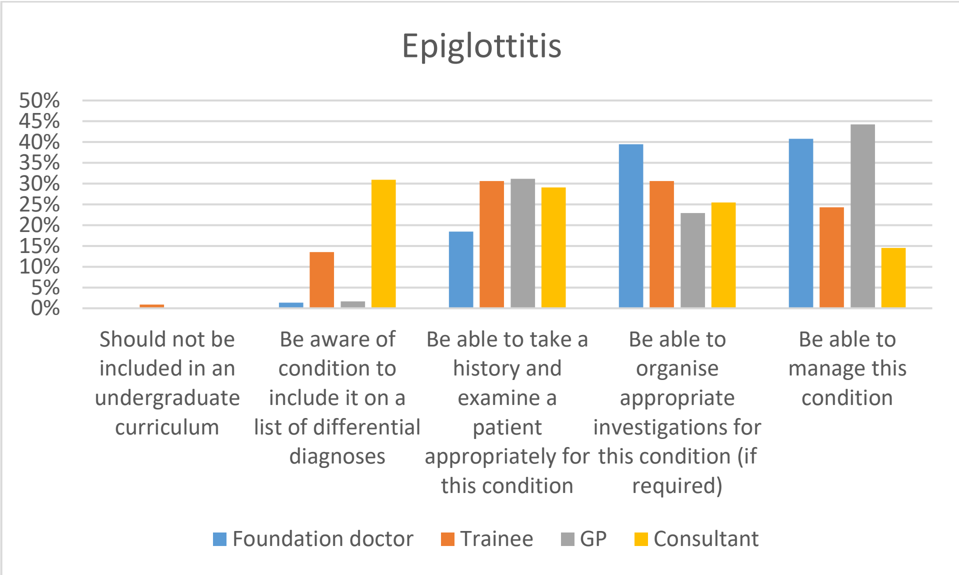

Figure 96: Bar chart showing responses for epiglottis by current post of the participant

Post hoc analysis of croup showed statistically significant differences between consultants and general practitioners (p=<.001), consultants and foundation year doctors (p=<.001), specialty trainees and foundation year doctors (p=.047). The mode for all groups was that students should be able to manage croup by graduation, except for consultants where the response was more split between options (*Figure 97*).

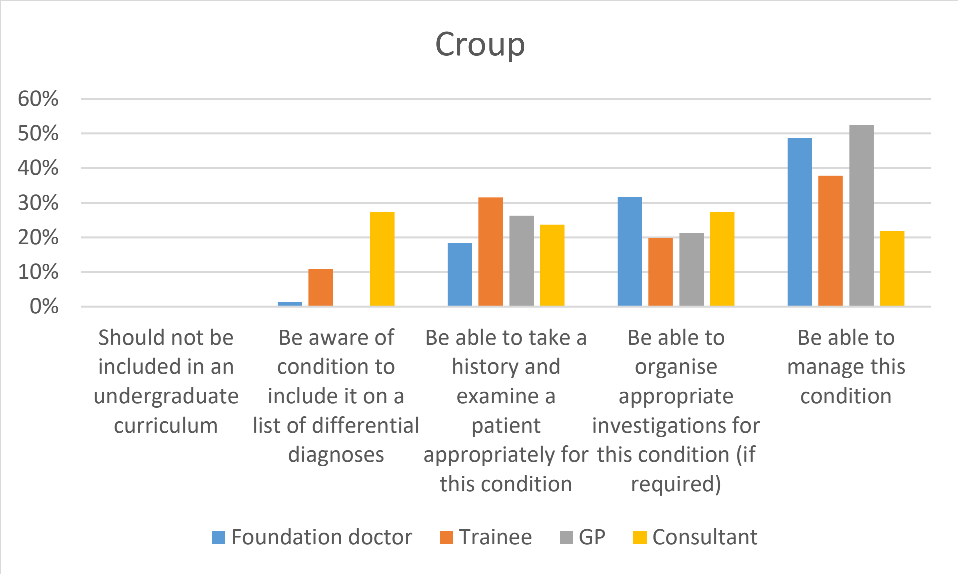

Figure 97: Bar chart showing responses for croup by current post of the participant

Post hoc analysis of salivary gland disorders showed statistically significant differences between foundation year doctors and general practitioners (p=.008), consultants and general practitioners (p=.021) and specialty trainees and general practitioners (p=.005). *Figure 98* shows the mode response for foundation year doctors and specialty trainees was for students to be aware of salivary gland disorders. General practitioners indicated a higher level of performance.

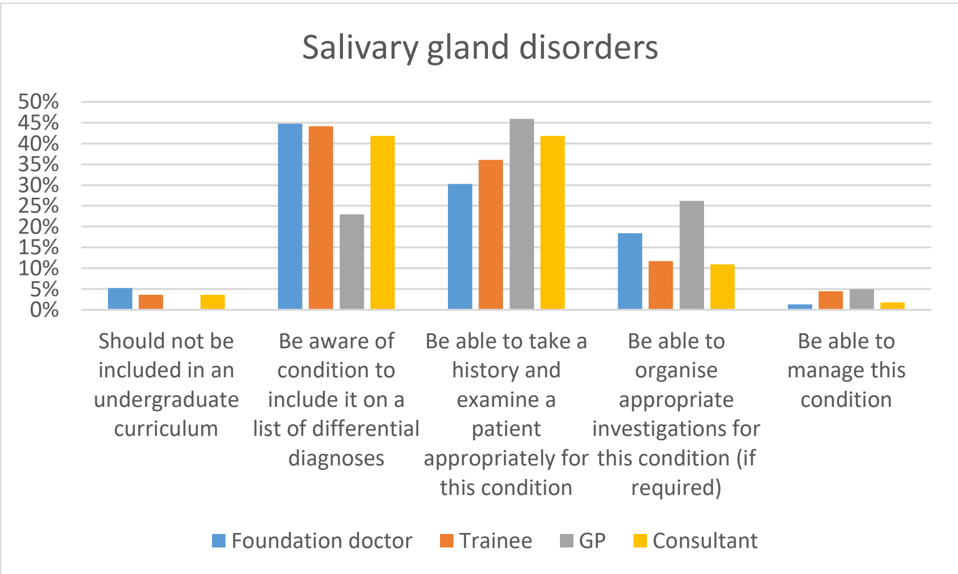

Figure 98: Bar chart showing responses for salivary gland disorders by current post of the participant

Post hoc analysis of thyroid disorders showed statistically significant differences between consultants and specialty trainees (*p*=<.001), consultants and general practitioners (*p*=<.001) and consultants and foundation year doctors (*p*=<.001). The mode response for all groups, except specialty trainees, was that students should be able to organise the appropriate investigations for a patient with a thyroid disorder (*Figure 99*).

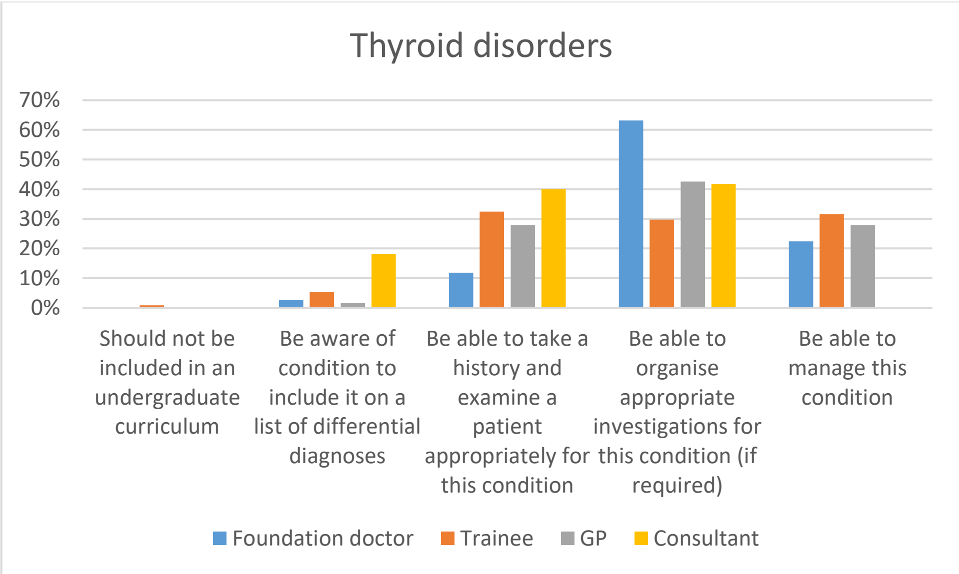

Figure 99: Bar chart showing responses for thyroid disorders by current post of the participant

Post hoc analysis revealed no significant inter group differences for thyroglossal duct cyst or branchial cysts.

Post hoc analysis of pharyngeal pouch showed statistically significant differences between consultants and general practitioners (*p*=.032), consultants and foundation year doctors (*p*=<.001) and specialty trainees and foundation year doctors (*p*=.035). With the exception of foundation year doctors, the mode for all groups was that students should be aware of this condition (*Figure 100*).

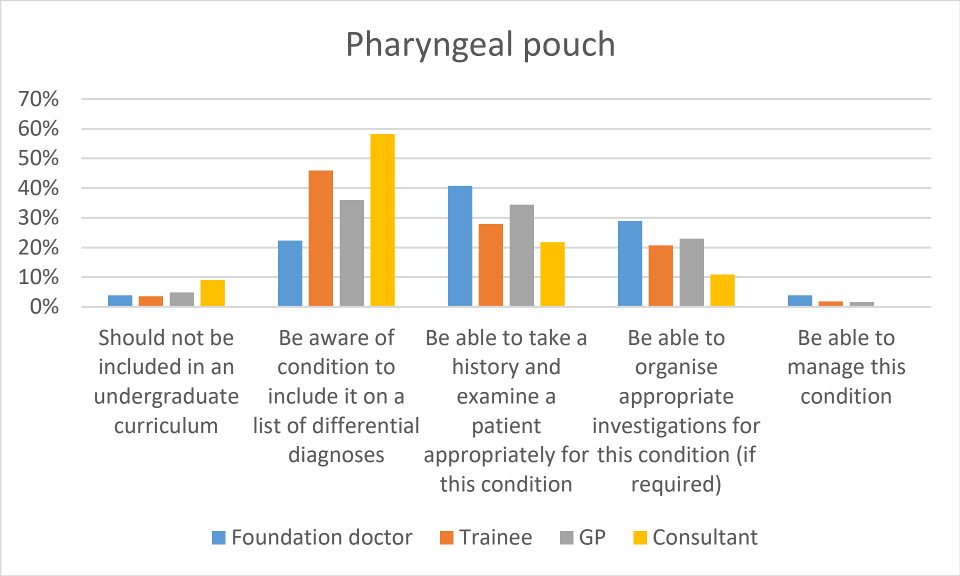

Figure 100: Bar chart showing responses for pharyngeal pouch by current post of the participant

Post hoc analysis of obstructive sleep apnoea showed statistically significant differences between consultants and specialty trainees (p=.011), consultants and general practitioners (p=.024), consultants and foundation year doctors (p=<.001), specialty trainees and foundation year doctors (p=.004) and general practitioners and foundation year doctors (p=.032). The mode response for all groups was that students should be able to organise appropriate investigations for this condition except for consultants, who were more likely to indicate a lower level of performance (*Figure 101*).

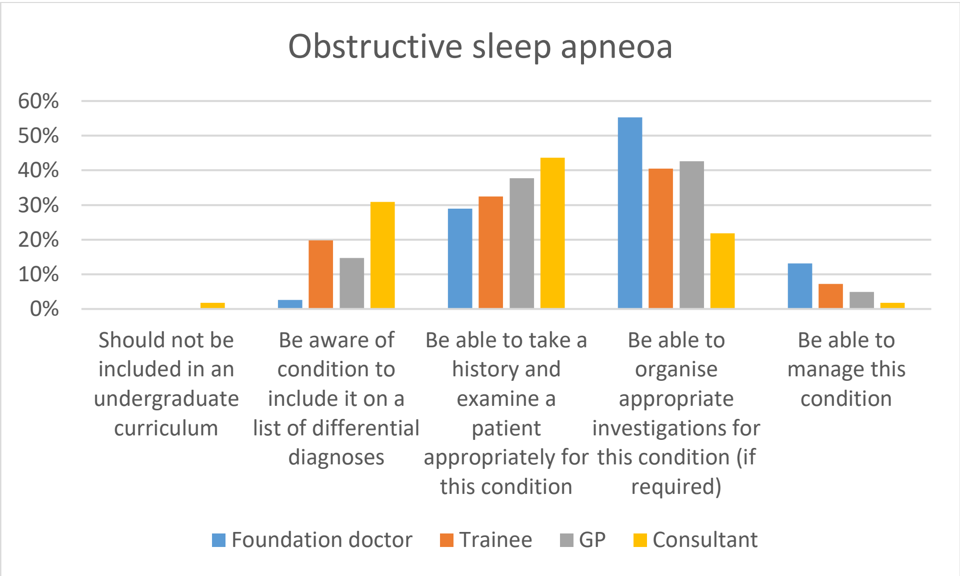

Figure 101: Bar chart showing responses for obstructive sleep apnoea by current post of the participant

Post hoc analysis of globus pharyngeus showed statistically significant differences between consultants and general practitioners (*p*=.009) and specialty trainees and general practitioners (*p*=.004). The mode response for all groups showed that students should be aware of this condition, apart from foundation year doctors where the responses were more spread out (*Figure 102*).

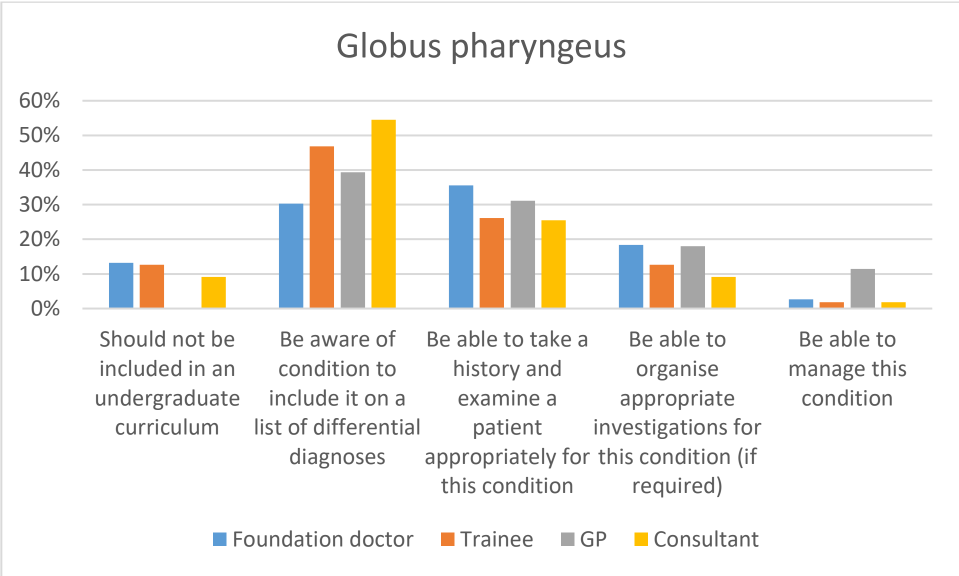

Figure 102: Bar chart showing responses for globus pharyngeus by current post of the participant

Post hoc analysis of laryngopharyngeal reflux showed statistically significant differences between consultants and general practitioners (*p*=<.001), specialty trainees and general practitioners (*p*=.001) and foundation year doctors and general practitioners (*p*=.009). The mode for consultants indicates that they feel that students should simply be aware of this condition by graduation, whereas there was more of spread of responses from the other groups, with general practitioners indicating a higher level of performance (*Figure 103*).

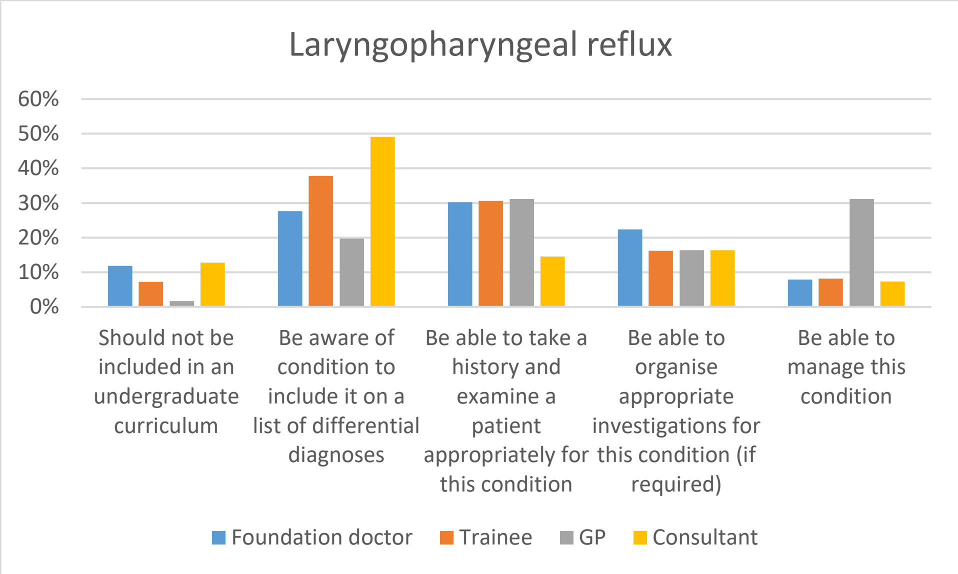

Figure 103: Bar chart showing responses for laryngopharyngeal reflux by current post of the participant

Post hoc analysis of pharyngitis showed statistically significant differences between consultants and foundation year doctors (*p*=.043), consultants and general practitioners (*p*=<.001), specialty trainees and general practitioners (*p*=<.001) and foundation year doctors and general practitioners (*p*=.004). General practitioners were more likely than other groups to indicate that students should be able to manage pharyngitis by the point of graduation (*Figure 104*).

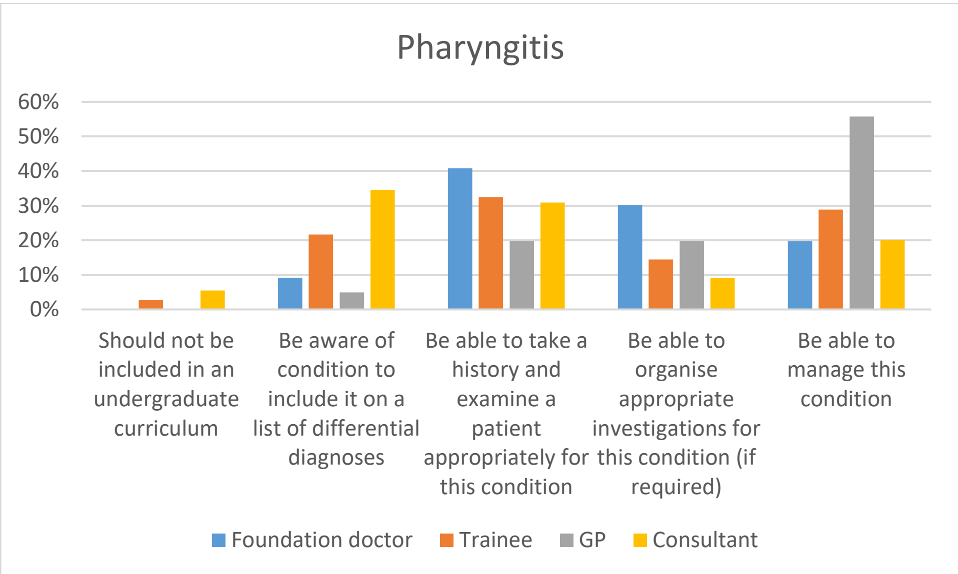

Figure 104: Bar chart showing responses for pharyngitis by current post of the participant

Subgroup analysis by current region of participant

Overview of results

Eight themes were analysed for statistical differences between regions: East of Scotland (n=62), North West of England (n=162) and London (n=53). This included a total of 101 individual topics. Only 15 of these topics showed a statistically significant difference between groups for the three main regions of the country studied. Post-hoc analysis was then carried out on these 15 groups which indicated that in only 11 of these were there actual statistically significant differences between the region of the participants following corrections for multiple comparisons.

Background questions

Participants were first asked to rate if "there is a need for ENT teaching in the undergraduate curriculum?" The distribution of responses was similar for all three regions, as assessed by visual inspection of a boxplot. The median responses showed no statistically significantly differences between groups, (p=.13). All groups agreed or strongly agreed that there was a need to undergraduate otolaryngology.

In response to the question relating to "value in a national ENT curriculum", the distribution of responses was similar for all three regions with the median responses showing no statistically significantly differences between groups (p=.96). Again, all groups agreed or strongly agreed that there was value in a national otolaryngology curriculum.

There was, however, a statistically significant difference between groups regarding the adequacy of "current undergraduate ENT teaching." Again, distributions were similar for all groups. Median responses were statistically significantly different between regions (p=<.001). Pairwise comparisons were therefore performed. Post hoc analysis showed statistically significant differences between the East of Scotland and both North West England (p=<.001) and London (p=<.001). The mode response of participants from the East of Scotland was 'neither agree or disagree' as opposed to the mode response from participants from London or North West England which was 'disagree' (*Figure 105*).

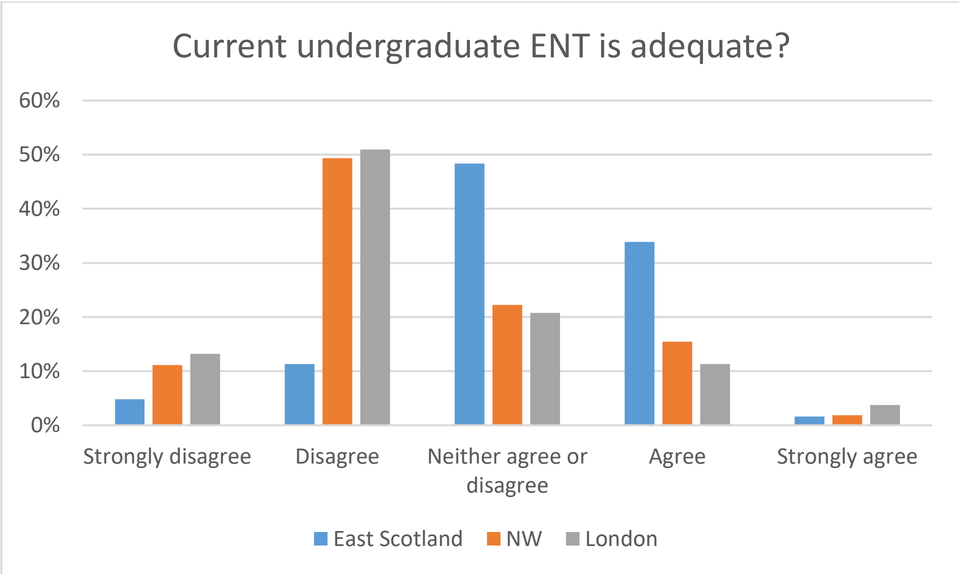

Figure 105: Responses for adequacy of current undergraduate otolaryngology teaching by region of participant.

Examination skills

Twelve examination skills were included in the questionnaire. No statistically significant differences were seen between groups in nine of the twelve (*Table 42*). For oral examination, Unterberger's test and a test of hearing a difference was detected. Post hoc analysis was undertaken using the same principles as previously stated.

For *Table 42* to *Table 49*: Topics where there is a statistically significant difference between groups dependent on their region are highlighted in yellow. The distributions column indicates whether distributions were similar between groups when assessed by visual inspection of a boxplot. H test refers to the Kruskal Wallis H test result. There were 2 degrees of freedom for all tests.

Table 42: Examination skills

	Examination skill	Distribution	H test	*p*-value
1	Nasal examination	Similar	0.054	.973
2	Oral examination	Similar	6.007	.050
3	Throat examination	Similar	0.741	.690
4	Laryngeal examination	Not similar	2.974	.226
5	Neck examination	Similar	2.738	.254
6	Salivary gland examination	Not similar	4.022	.134
7	Otoscopy	Similar	0.976	.614
8	Tuning fork tests	Not similar	2.782	.249
9	Romberg's test	Not similar	5.379	.068
10	Dix-Hallpike test	Not similar	3.696	.158
11	Unterberger's test	Not similar	6.378	.041
12	A test of hearing	Not similar	7.153	.028

Post hoc analysis revealed no significant inter group differences for either oral examination or Unterberger's tests. For a test of hearing, however, post hoc analysis showed statistically significant differences between the East of Scotland and London (p=.024). *Figure 106* shows the responses by region and highlights that participants from London were statistically more likely to indicate that students should be able to perform a test of hearing, however, this was the mode response for the other two regions as well.

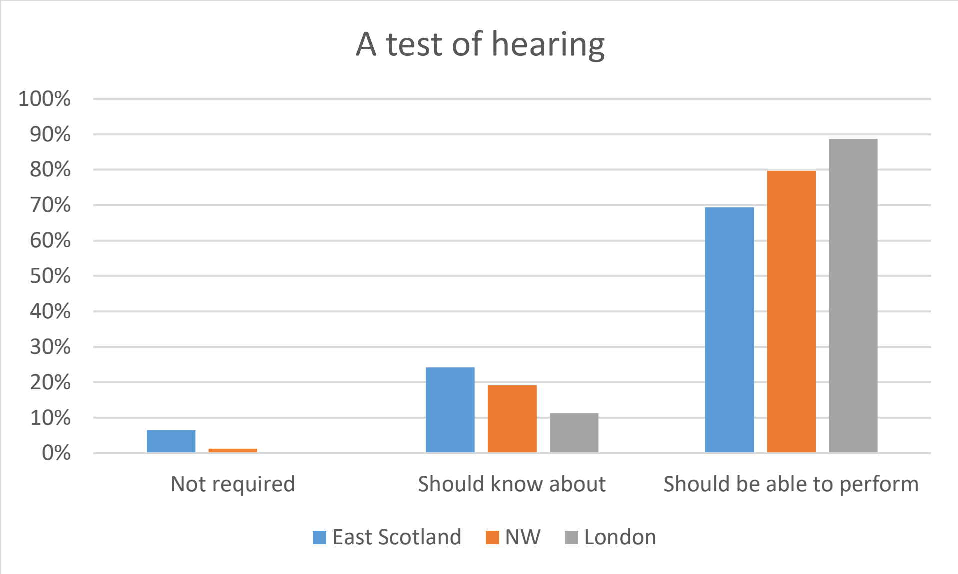

Figure 106: Bar chart showing responses to a test of hearing by region of participant

Acute conditions

Of the nine acute conditions, only one showed a statistically significant difference between the regions of the respondents (*Table 43*). For head and neck foreign bodies the distributions were similar for the three groups. Median responses were statistically significantly different between regions (*p*=.046). Post hoc analysis showed a statistically significant difference between the North West England and London (*p*=.043).

Table 43: Acute conditions

	Acute condition	Distribution	H test	*p*-value
1	Upper airway obstruction	Similar	2.561	.278
2	Epistaxis	Similar	0.414	.813
3	Nasal trauma	Not similar	3.645	.162
4	Acute vertigo	Not similar	2.209	.331
5	Pinna haematoma	Not similar	0.679	.712
6	Tonsillitis	Similar	2.039	.361
7	Quinsy / peri-tonsillar abscess	Similar	3.261	.196
8	Head and neck foreign bodies	Not similar	6.143	.046
9	Orbital cellulitis	Not similar	2.108	.349

Examining the head and neck foreign bodies topic in more detail (*Figure 107*), it can be seen that despite a statistically significant difference between the North West of England and London, the mode response for all three regions was for a student to be able to recognise and assess and patient with a head and neck foreign body.

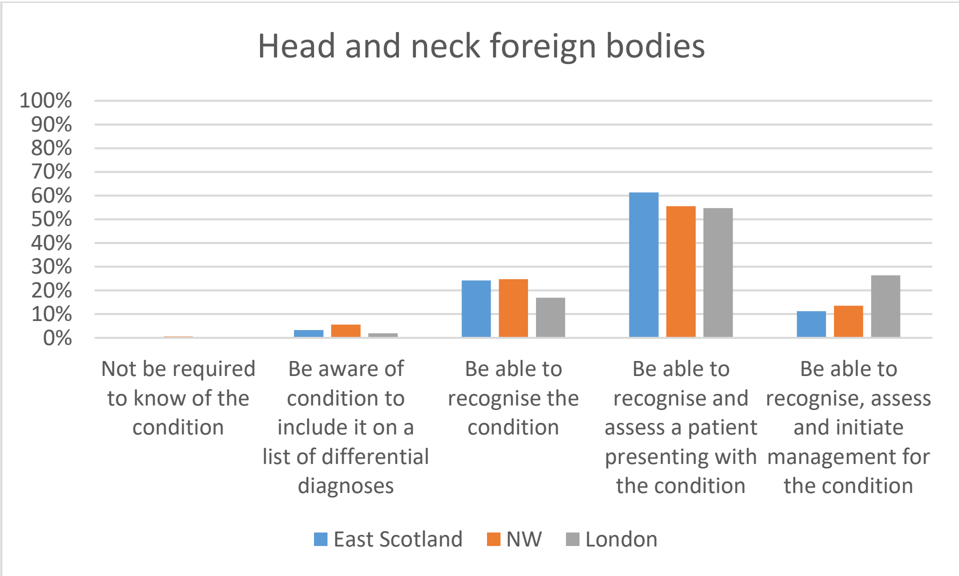

Figure 107: Bar chart showing responses for head and neck foreign bodies by region of participant

Investigations

Seven investigations were analysed for differences in relation to the region of the country where the respondent was based. There were statistically significant differences between groups for only one of the investigations (*Table 44*). Post hoc analysis was undertaken for this vestibular function testing but showed no statistically significant difference between groups on pairwise comparisons.

Table 44: Investigations

	Investigation	Distribution	H test	*p*-value
1	Audiometry	Not similar	3.256	.196
2	Tympanometry	Similar	2.715	.257
3	Neonatal hearing screening	Similar	2.018	.365
4	Vestibular function tests	Similar	6.389	.041
5	Allergy testing	Similar	1.421	.491
6	Throat swabs	Not similar	5.805	.055
7	Tests for glandular fever	Not similar	3.539	.170

Procedures

Thirteen procedures were analysed for statistically significant differences in relation to the region of the country where the respondent was based. There were statistically significant differences between groups for four of the procedures (*Table 45*). For all four procedures post hoc analysis was undertaken.

Table 45: Procedures

	Procedure	Distribution	H test	*p*-value
1	Nasal packing	Not similar	4.579	.101
2	Nasal cautery	Similar	4.329	.115
3	Grommet insertion	Not similar	4.775	.092
4	Mastoid surgery	Not similar	11.534	.003
5	Functional Endoscopic Sinus Surgery (FESS)	Not similar	8.533	.014
6	Tracheostomy	Not similar	12.228	.002
7	Tonsillectomy	Similar	1.412	.494
8	Septoplasty	Not similar	4.778	.092
9	Cricothyroidotomy	Not similar	3.546	.170
10	Nasendoscopy	Not similar	3.986	.136
11	Videostroboscopy	Not similar	5.166	.076
12	Indirect laryngoscopy	Not similar	17.955	<.001
13	Fine needle aspiration for cytology	Similar	4.780	.092

Post-hoc analysis for mastoid surgery showed a statistically significant difference between North West England and London (p=.002). *Figure 108* illustrates that the mode response from those in North West England was that students should have heard of mastoid surgery, whereas, from London and the East of Scotland, participants felt that students should be aware of the indications for mastoid surgery.

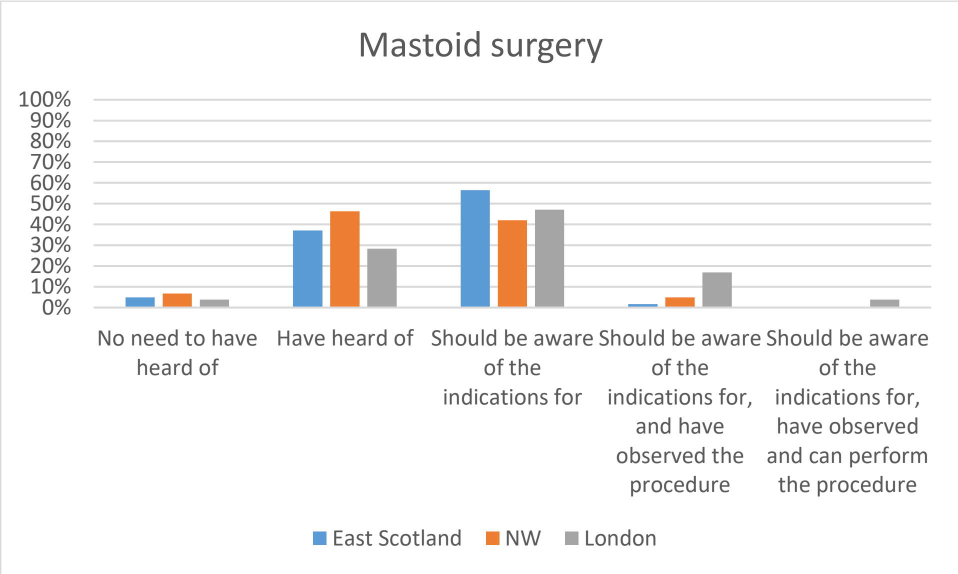

Figure 108: Bar chart showing responses for mastoid surgery by region of participant

Post hoc analysis for functional endoscopic sinus surgery reveals a statistically significant difference between North West England and London (p=.011). *Figure 109* shows a similar pattern to mastoid surgery with the mode response from the North West of England indicating a lower level of performance than the other two regions.

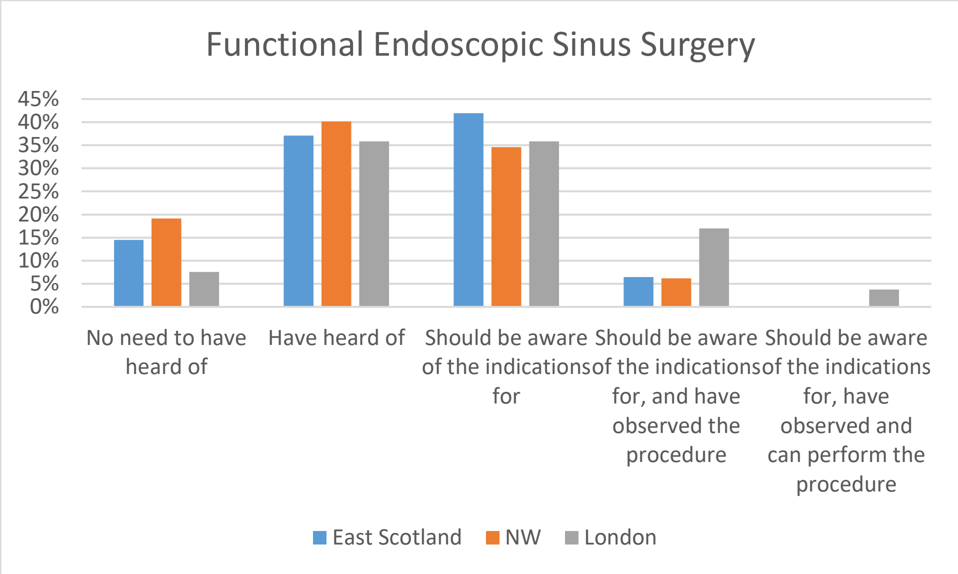

Figure 109: Bar chart showing responses for Functional Endoscopic Sinus Surgery by region of participant

Post hoc analysis for tracheostomy revealed a statistically significant difference between both the East of Scotland and London (p=.005) and North West England and London (p=.004). It can be seen from *Figure 110* that although statistically significant differences were seen between groups, the overall mode response from each group indicated that students should be aware of the indications for tracheostomy.

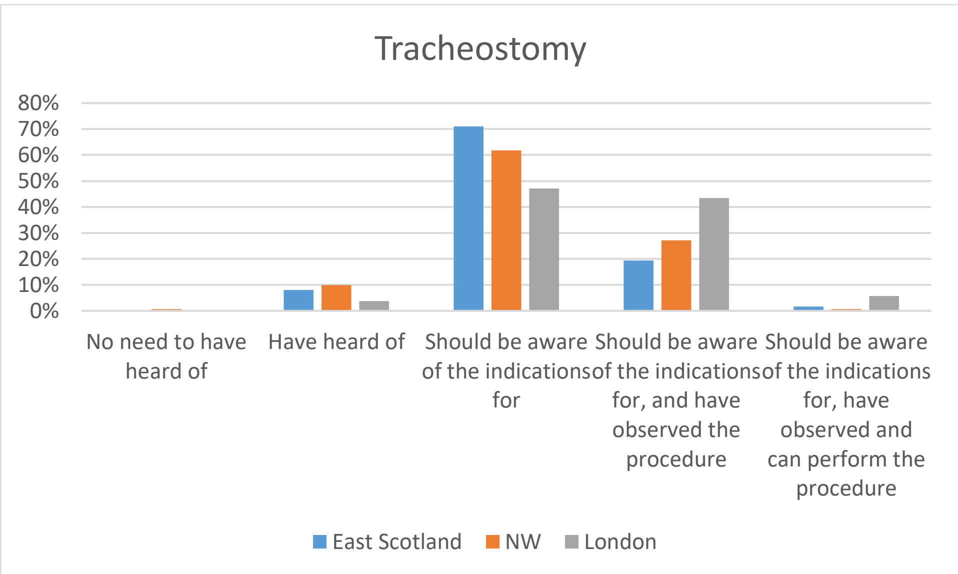

Figure 110: Bar chart showing responses for tracheostomy by region of participant

Post hoc analysis for indirect laryngoscopy revealed a statistically significant difference between both North West England and London (p=.014) and North West England and the East of Scotland (p=<.001). *Figure 111* shows that the mode responses from participants from North West England was that students should have heard of indirect laryngoscopy compared to the other groups who indicated that students should be aware of the indications for or have observed the procedure.

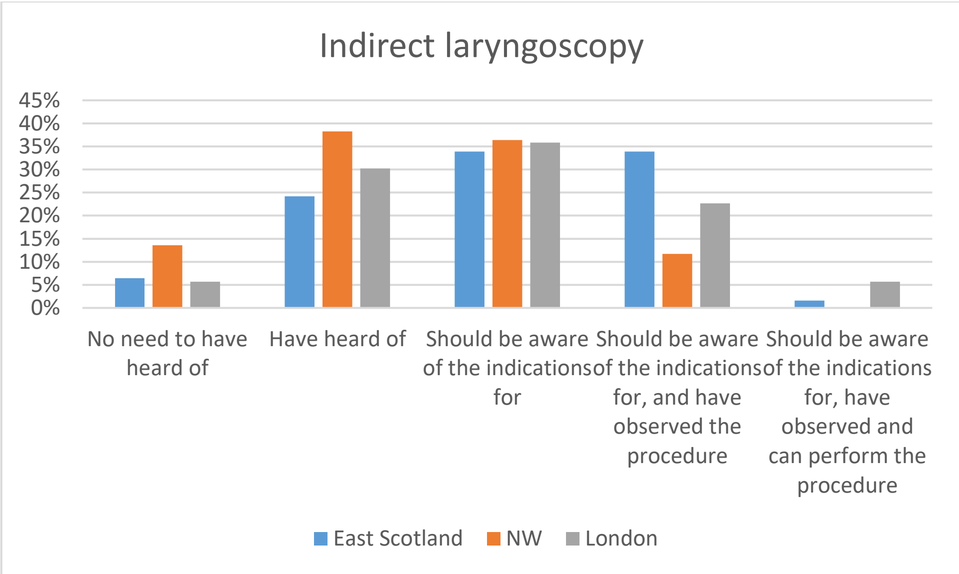

Figure 111: Bar chart showing responses for indirect laryngoscopy by region of participant

Psychosocial/ non-technical skills

There were no statistically significant differences between the three regions when comparing them for psychosocial / non-technical skills elements of the undergraduate otolaryngology curriculum.

Table 46: Psychosocial topics

	Psychosocial / non-technical elements	Distribution	H test	*p*-value
1	Educational consequences of hearing loss	Not similar	1.993	.369
2	Social consequences of hearing loss	Not similar	4.274	.118
3	Effective communication with a hearing impaired individual	Not similar	2.169	.338
4	The multidisciplinary team approach to deafness	Similar	1.064	.587
5	The importance of voice in verbal and non-verbal communication	Not similar	3.693	.158
6	Communicating with laryngectomees	Similar	0.384	.825
7	The multidisciplinary team approach to voice disorders	Similar	2.958	.228
8	Behavioural and psychological factors which may contribute to ENT conditions (eg globus)	Not similar	4.140	.126
9	Psychosocial consequences of prolonged vertigo	Similar	1.817	.403

Clinical conditions

Otology

Only two otology topics showed a statistically significant difference between respondents from the three regions of the country (*Table 47*).

Table 47: Otology topics

	Otology topics	Distribution	H test	*p*-value
1	Ototoxicity	Similar	0.401	.818
2	Otosclerosis	Not similar	1.241	.538
3	Presbyacusis	Not similar	7.821	.020
4	Noise induced hearing loss	Not similar	7.110	.029
5	Congenital hearing loss	Similar	0.313	.855
6	Conductive hearing loss	Not similar	5.256	.072
7	Sensorineural hearing loss	Similar	4.783	.091
8	Auditory Processing Disorder	Similar	1.416	.493
9	Vestibular neuritis / Labyrinthitits	Not similar	0.954	.621
10	Meniere's Disease	Not similar	0.030	.985
11	BPPV	Not similar	0.681	.711
12	Vestibular Migraine	Not similar	2.310	.315
13	Presbystasis	Similar	0.664	.718
14	Complications of middle ear disease	Similar	2.755	.252
15	Acute otitis media	Similar	0.061	.970
16	Chronic otitis media (including cholesteatoma)	Similar	0.632	.729
17	Chronic otitis media with effusion	Not similar	0.440	.803
18	Otitis externa	Similar	0.415	.813
19	Mastoiditis	Similar	1.282	.527
20	Aural granulations / polyps	Similar	0.864	.649
21	Vestibular schwannoma	Similar	0.928	.629
22	Barotrauma	Similar	0.276	.871
23	Eustachian tube dysfunction	Not similar	3.247	.197
24	Facial palsy	Similar	2.239	.326
25	Tympanic membrane perforation	Similar	0.934	.627
26	Tinnitus	Similar	0.333	.847
27	Tympanosclerosis	Similar	3.494	.174
28	Chondrodermatitis nodularis helicis	Similar	2.407	.300

Post hoc analysis of presbyacusis showed a statistically significant difference between the East of Scotland and North West England (p=.018). *Figure 112* shows that the mode response from participants from North West England and London both indicate that students should be aware of the condition to include it on a list of differential diagnoses, whereas participants from the East of Scotland felt that students should be to take a history and examine a patient with presbyacusis.

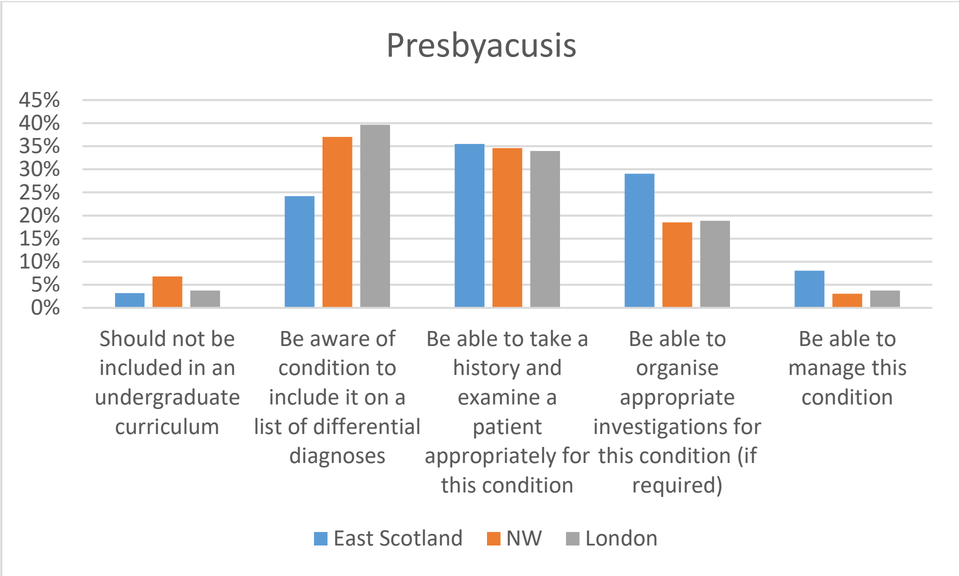

Figure 112: Bar chart showing responses for presbyacusis by region of participant

Post hoc analysis of noise induced hearing loss showed a statistically significant difference between the East of Scotland and North West England (p=.025). *Figure 113* shows that the mode response from North West England was that students should be aware of this condition, with East of Scotland participants indicating students should be able to take a history and examine such patients and London responses being split between these two options.

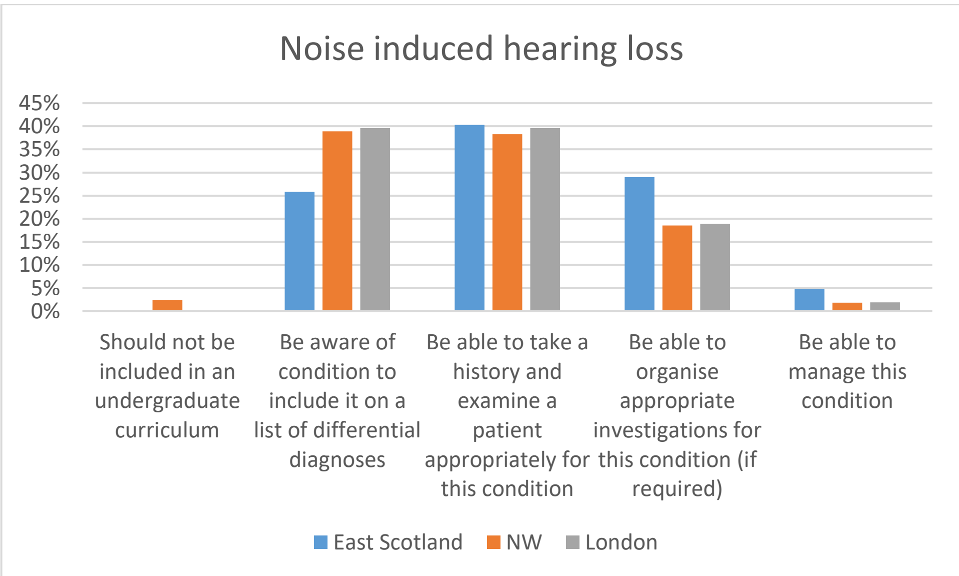

Figure 113: Bar chart showing responses for noise induced hearing loss by region of participant

Rhinology

Analysis of rhinology topics for survey participants from the different regions showed that only chronic rhinosinusitis showed a significant difference between groups (*Table 48*).

Table 48: Rhinology topics

	Rhinology topics	Distribution	H test	*p*-value
1	Allergic rhinitis	Similar	2.360	.307
2	Non-allergic rhinitis	Similar	1.971	.373
3	Acute rhinosinusitis	Not similar	5.387	.068
4	Chronic rhinosinusitis (including polyps)	Not similar	10.465	.005
5	Septal deviation	Not similar	4.832	.089
6	Atypical facial pain	Not similar	5.146	.076

Post hoc analysis for chronic rhinosinusitis showed a statistically significant difference between the East of Scotland and North West England (*p*=.008). Although there was a statistically significant difference between these two groups, *Figure 114* illustrates that the mode response from each group was that students should be able to take a history and examine a patient with this condition.

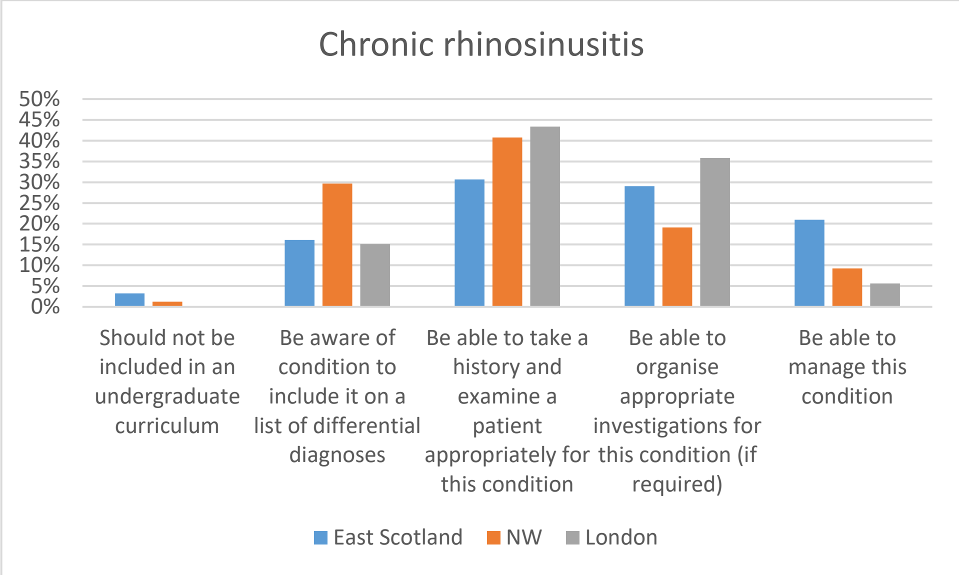

Figure 114: Bar chart showing responses for chronic rhinosinusitis by region of participant

Laryngology/ other clinical topics

Analysis of topics in the laryngology and other clinical topics category showed there to be statistically significant differences between groups in only three of the seventeen topics (*Table 49*).

Table 49: Laryngology and other clinical topics

	Laryngology / other clinical topics	Distribution	H test	*p*-value
1	Benign vocal cord lesions	Similar	1.371	.504
2	Laryngeal papillomatosis	Not similar	2.766	.251
3	Laryngomalacia	Similar	5.155	.076
4	Muscle tension dysphonia	Not similar	5.042	.080
5	Vocal cord palsy	Not similar	0.230	.892
6	Laryngitis	Similar	2.144	.342
7	Epiglottitis	Similar	1.373	.503
8	Croup	Similar	0.350	.840
9	Salivary gland disorders	Not similar	7.321	.026
10	Thyroid disorders	Not similar	0.599	.741
11	Thyroglossal duct cyst	Not similar	7.538	.023
12	Branchial cyst	Not similar	5.254	.072
13	Pharyngeal pouch	Not similar	5.675	.059
14	Obstructive sleep apnoea	Not similar	1.948	.378
15	Globus pharyngeus	Not similar	4.979	.083
16	Laryngopharyngeal reflux	Not similar	11.793	.003
17	Pharyngitis	Not similar	3.608	.165

In the three topics where there was a statistically significant result, post hoc analysis was undertaken.

Post-hoc analysis of salivary gland disorders showed there to be no statistically significant difference between groups on pairwise comparisons.

Analysis of thyroglossal duct cyst responses revealed a statistically significant difference between the North West England and London (p=.027). *Figure 115* shows that the mode response from participants from the North West of England and London was that students should be able to take a history and examine these patients with the mode response from the East of Scotland showing that they should be aware of the condition to include it on a list of differential diagnoses.

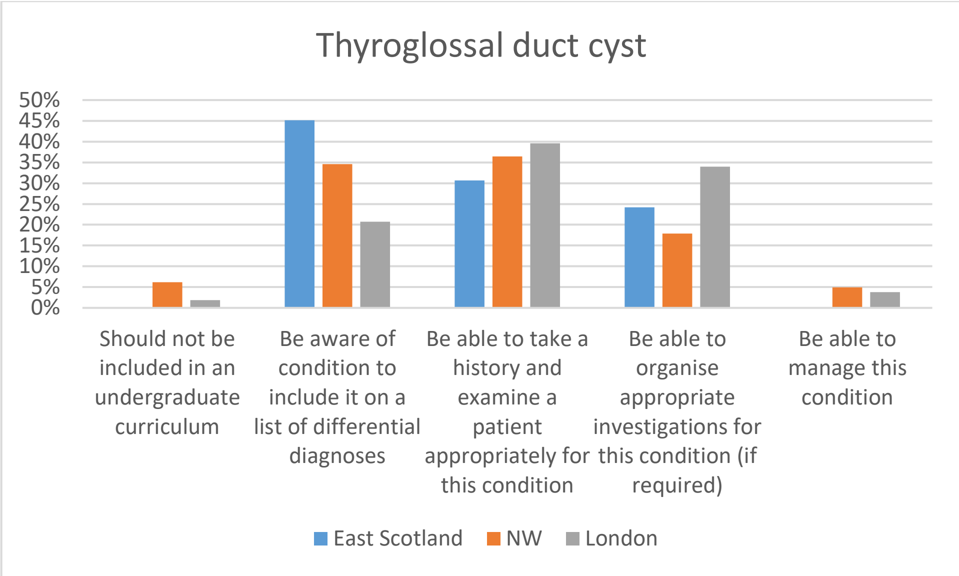

Figure 115: Bar chart showing responses for thyroglossal duct cyst by region of participant

Finally, post hoc analysis of laryngopharyngeal responses revealed a statistically significant difference between both the East of Scotland and North West England (p=.005). *Figure 116* illustrates that the mode response from participants from the East of Scotland and London was that students should be able to take a history and examine patients with laryngopharyngeal reflux, whereas those from the North West of England were more likely to indicate that they should simply be able to include it on a list of differential diagnoses.

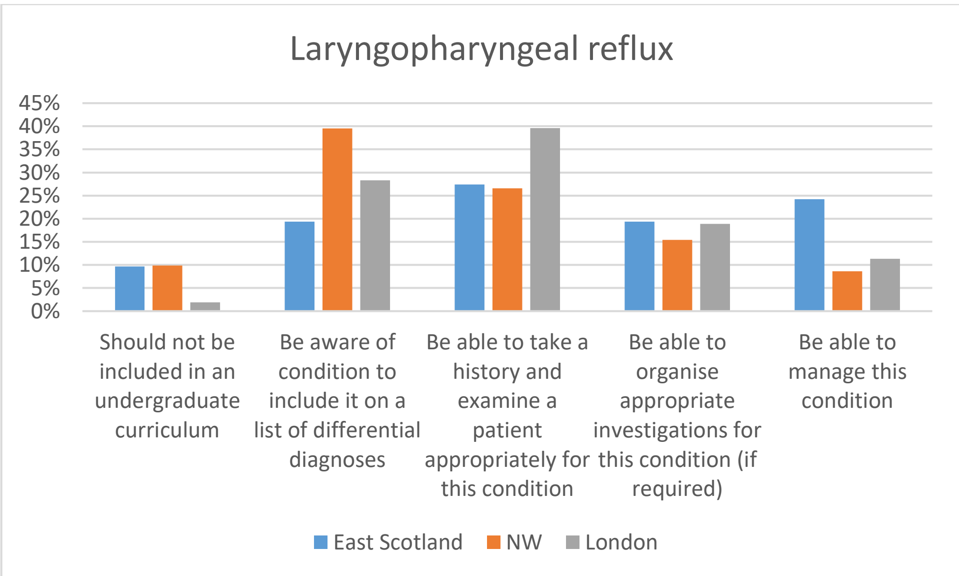

Figure 116: Bar chart showing responses for laryngopharyngeal reflux by region of participant

Discussion

Otolaryngology in the curriculum

Studies show that many medical schools within the United Kingdom have limited exposure to otolaryngology at an undergraduate level and the findings from this study correlate with the perception that current medical school otolaryngology training is inadequate.[55, 56] Only 21% of participants in this study felt that current undergraduate otolaryngology teaching was adequate. What is striking is that it was the more junior participants, i.e. foundation year doctors and specialty trainees, who felt most strongly that current undergraduate training was inadequate. These are the groups who have not only been through the medical school system most recently but are also the ones putting it into practice across a wide range of specialties.

One proposed theory for this is that restrictions to working hours brought about by the European Working Time Directive (EWTD) have led to an increase in the requirement by doctors in training to cover a specialty in which they are not specifically training.[141, 142] This has been highlighted as an issue by the Association of Surgeons in Training (ASiT) who have produced recommendations for doctors providing emergency cross cover.[12] Otolaryngology is one of the specialties which commonly relies on cross cover.[143] In 2009, Sharpe *et al.* published a survey showing a lack of confidence amongst surgical trainees who cross cover otolaryngology.[143] They proposed improving induction training given to those cross covering otolaryngology as a solution. In 2010, Sharma *et al.* recommended formalising undergraduate otolaryngology training to improve utilisation of the time a student spends in otolaryngology to benefit those providing cross cover.[144]

Twenty-eight percent of participants neither agreed nor disagreed about the adequacy of undergraduate otolaryngology. It is proposed that this may be because a large number of the participants have little direct involvement with current undergraduate otolaryngology. The response, however, gives some insight into the feelings of participants that the current undergraduate otolaryngology teaching is inadequate. This may also have provided a motivating factor for participation in this study.

There was a general agreement that otolaryngology should be included in the undergraduate curriculum with 92% of participants agreeing or strongly agreeing with this. It is of interest that the mode result from non-otolaryngology consultants was 'neither agree nor disagree' with the need for otolaryngology in the undergraduate curriculum (*Figure 18*). This may indicate that there is reluctance to provide an opinion out with their area of specialist interest. This may have implications for future curriculum design processes with regards to who is involved. It may also indicate that caution should be applied when utilising specialists out with their own area of interest in curriculum design. It is, however, seen as a strength of this survey that participants who did not necessarily have an opinion on the inclusion of otolaryngology in the undergraduate curriculum would complete the survey and therefore provide a wide range of opinion in the responses received. This finding also has implications for the design of the subsequent focus group stage of this study.

Otolaryngology clinical topics

Examination skills

The results show that the majority of doctors feel that medical students should be able to perform a competent examination in otolaryngology. Consensus was seen for each examination skill, shown by a mode response of over 50%. Participants did feel that three of the examination skills listed should simply be known about. These were, in general, examination skills which were more specialist in nature such as Unterberger's test for detecting vestibular pathology or ones which generally require specialist equipment, such as laryngeal examination.

There were, however, differences in response dependent on the post of the participant. For example, 97% of general practitioners felt that students should be able to perform examination of a throat, however this percentage dropped to only 65% for consultants. This was broken down as 69% for otolaryngology consultants and 61% for non-otolaryngology consultants. This indicates that there are differences in the perceived competence levels for graduating medical students between groups of doctors.

Similar trends were seen with other examination skills. Examination of the throat provides a good example of the potential effects of this. Studies have shown that throat conditions are prevalent in the general population, are a common reason for consultation with general practitioners and are a common reason for referral to secondary care.[63, 113, 145] Ninety-seven percent of general practitioners indicated that students should be able to perform this examination. This drops to 65% for hospital consultants, with 35% indicating that students should simply be aware of this. Often, curricula are designed and delivered by specialists, i.e. consultants in otolaryngology. Given that there is a target for 50% of medical students to enter general practice in the UK, it would seem important that general practitioner's learning needs are addressed.[8] It can be seen however, that topics deemed important by general practitioners may not be included in the curriculum if the development process was unidimensional. Additionally, if we compare the example of throat examination to the results from study one, it can be seen that only 11 of the 19 schools specifically included throat examination in their curriculum. This trend is repeated throughout the results.

This has implications for both curriculum development and assessment. From a curriculum point of view, it is therefore important to consider the current post of those involved in the curriculum planning process as topics deemed important by one group may be overlooked. From an assessment point of view, it is important to be aware that the post of the physician may influence their perception of the performance level of the student.

In general, despite statistical differences between subgroups of doctors based on their current post there was general agreement on the level of competence for each examination topic. There are, however, exceptions to this. For example, although the overall mode for salivary gland examination was that students should be able to perform this examination, when analysing the subgroups, the mode for foundation year doctors was that students should simply know about this examination.

These themes will be explored in more detail in study three, however, one proposed theory for this is that clinical experience shapes the perceived importance of knowing how to perform a skill. Some evidence for this is shown by the fact that there was an increasing number of participants selecting the "perform" option going from foundation year doctors through specialty trainees and onto general practitioners.

Procedures

Participants did not feel that students should have observed any specific operative procedure, including tonsillectomy. This is despite tonsillectomy being one of the most commonly performed operations in the United Kingdom.[146] It is noted that the questionnaire asked about specific operations and not about experience in theatre in general, which may have yielded different results. This is evidenced by a study into student perceived benefit of theatre attendance which showed high levels of satisfaction and an agreement that theatre attendance was an important part of the curriculum.[99] Given that the degree awarded in the majority of UK medical schools is a Bachelor of Medicine, Bachelor of Surgery (MBChB), it is of interest that there appears to have been a shift away from an expectation to understand, observe and perform procedures.

Despite studies highlighting a lack of confidence amongst junior doctors when managing common otolaryngology conditions which may require procedural skills such as epistaxis, and calls from otolaryngology specialists for more training at an undergraduate level to remedy this, the general response in this survey indicated that the majority of doctors did not feel it was necessary to be able to perform any otolaryngology procedure, including nasal cautery and packing. With increasing requirements of junior doctors to cross cover other specialties, this is an educational need which may then need to be met at the postgraduate level.[12] To date, the evidence suggests that this is not happening with only 35% of core surgical trainees having received any teaching on otolaryngology emergencies before starting a post requiring otolaryngology cross cover.[143] In addition, lack of exposure to surgical specialities may be contributing to the reduction in applications seen in surgical specialties.[147]

Clinical conditions

When analysing the responses for clinical conditions it can be seen that participants only indicated that students should be able to manage a few otolaryngological conditions by the time of graduation. These included acute otitis media, otitis externa, acute rhinosinusitis, allergic rhinitis, epiglottitis, laryngitis and croup. These conditions are some of the more commonly encountered conditions and therefore it may be hypothesised that a higher level of performance would be expected.[113, 145] There was however, no universal agreement on the performance level of students for these conditions between subgroups.

Although no major differences were seen in terms of the area of the country of the participating doctor, the current post of the doctor had an influence over their response. Prior to this study it had been hypothesised that a specialist may have had higher expectations for students when dealing with common otolaryngology conditions, however, the results from this study indicate that this may not be the case. In particular, otolaryngology consultants were less likely to think that a student should be able to manage a condition. An example of this is non-allergic rhinitis, where otolaryngology consultants felt that students should simply be aware of this condition whilst general practitioners felt that a graduating student should be able to manage it.

This again highlights potential implications for the curriculum development process undertaken in medical schools where specialists are involved in devising their own curriculum for undergraduates. The results from this study indicate that, not only may important topics be neglected but that the expected performance level may be affected by the composition of those involved in the design process. Consideration must therefore be given to the opinions of others in specialty undergraduate curriculum development. This is an area which will be explored in more detail in study three of this project (focus groups).

Comparison to undergraduate curriculum guidance

Curriculum guidance for undergraduate education is produced by a number of different organisations. Three main ones have direct relevance to UK undergraduate curricula: the General Medical Council's Outcomes for Graduates, the Scottish Doctor Learning Outcomes and the Tuning Project for Medicine, a European wide consultation on outcomes in medicine.[2, 29, 35, 148, 149] So how do the findings of this study relate to the guidance published on undergraduate medical curricula?

In the General Medical Council's Outcomes for Graduates, there is an emphasis on the ability to "carry out a consultation with a patient" (Outcomes 2, The doctor as a practitioner) [2]. This includes the ability to perform an examination, obtain a history and "diagnose and manage clinical presentations". Another subheading states that graduates should be able to "provide immediate care in medical emergencies" which includes the ability to "diagnose and manage acute medical emergencies".

The Scottish Doctor Learning Outcomes identifies key domains across Scottish medical schools.[148]. These are refined into a number of separate areas of learning outcomes such as "clinical skills".[35] The main standards set out in the Scottish Doctor document correlate well with the findings in the present study. For example, "undertake physical examination of patients" was included in the Scottish Doctor learning outcomes, but in addition, it was felt that students should be able to <u>interpret</u> the results of history taking and physical examination and make a diagnosis of "life-threatening conditions requiring immediate treatment". We can see from the results that respondents placed an emphasis on students being able to perform examination skills rather than simply knowing about them and, from questions relating to clinical conditions, apart from acute conditions, participants tended to indicate that students should be able to take a history and perform an examination appropriate for a condition without formally being able to manage the condition. The exceptions to this, where respondents indicated a higher level of performance, were generally either common conditions e.g. pharyngitis or those which were acute or potentially life threatening conditions.

A similar emphasis was seen in the Tuning Project for Medicine with the two most highly ranked areas of importance being the ability to "carry out a consultation with a patient (history, examination…)" and "provide immediate care of medical emergencies".[149] The expanded report describes the results of the outcomes in more detail and places the ability to "take a history" and "carry out a physical examination" at the top of the section relating to the ability to consult with a patient.

The results are mildly incongruous in relation to some of the vagaries which are acknowledged and almost impossible to avoid in large, overarching documents such as the GMC's Outcomes for Graduates. The above three documents outline the need for graduating students to be able to manage clinical conditions but do not specify which conditions they are relating to.

GMC	"Formulate a plan for treatment, management and discharge"
Scottish Doctor	"Formulate a management plan"
Tuning Project	"negotiate an appropriate management plan…"

The results indicate that for the vast majority of otolaryngology conditions, doctors feel that students should simply be able to take a history and examine the patient appropriately for a condition, highlighting the diagnostic element rather than management of a condition. The exceptions to this were conditions which are commonly encountered such as acute otitis media or otitis externa. It is acknowledged that these could be seen as acute conditions. All three of the above documents differentiate 'routine' clinical conditions from life threatening ones and state that graduates should be able to recognise and manage medical emergencies.

GMC	"Diagnose and manage acute medical emergencies"
Scottish Doctor	"Recognition of important and life threatening conditions requiring immediate treatment"
Tuning Project	"treat acute medical emergencies"

The Scottish Doctor document also highlights the "important" conditions element. This was not seen in the other two documents but is in keeping with the results obtained from this study where there appears to be a differentiation between life threatening, acute, common and other clinical conditions; the common category correlating with the 'important' category in the Scottish Doctor.

The results indicate that doctors feel that a higher level of performance should be expected of students for life threatening, acute and common otolaryngology conditions. The level of performance which doctors indicated for the remaining clinical conditions (the majority) was generally one in which students were expected to have the knowledge and skills required to take an appropriate history and perform an appropriate examination for the condition but stopped short of an expectation on the ability to manage a condition.

The three main outcome documents all mention investigations and procedures. The GMC state that students should be able to "formulate a plan of investigation…" and "interpret the results of investigations".[2] They list a number of diagnostic procedures in a separate appendix and make reference to "Taking nose, throat and skin swabs". The Scottish Doctor document mentions this same outcome whereas the Tuning Project is more vague and simply states that students should be able to "order appropriate investigations and interpret the results".[29, 35] The results from the present study show that participating doctors agree that students should be able to take and interpret throat swabs. Specifically relating to otolaryngology, the only other investigation which participants felt that students should be able to perform and interpret was tests for glandular fever.

The results correlate particularly with the recommendations from the Scottish Doctor document with regards to procedural and surgical skills.[35] The Scottish Doctor outcomes appear to be the most specific, perhaps relating to the smaller number of universities involved.[148] The Scottish Doctor has a separate surgery section and states that students should have a knowledge of common surgical problems and the indications for these. Participants in the present study felt that, for the majority of the procedures included, students should be aware of the indications for these procedures which included tonsillectomy and tracheostomy. The Tuning Project makes no reference to specific otolaryngology conditions but lists a number of other practical procedures expected of students.[29] Both the GMC and the Scottish Doctor documents include an outcome relating to the 'surgical scrub'. Participants in the current study did not indicate that students should be able to perform any specific otolaryngological procedure by graduation but the inclusion of such outcomes in the outcomes documents indicates that some exposure to surgery is required but that this may not necessarily have to be specialty or procedure specific.

All three main curriculum outcome documents make reference to psychosocial topics.[2, 29, 35] The psychosocial topics included in the current study can be split into three main categories: communication skills, multidisciplinary working and behavioural or psychosocial aspects of disease.

Participants deemed topics relating to hearing and voice to be the most important specifically related to otolaryngology. The Scottish Doctor document specifically mentions communication with deaf individuals and the GMC states that students should "appreciate the significance of non-verbal communication". Both the GMC and Scottish Doctor documents mention working with other health professionals or the roles of the multidisciplinary team. All three outcome documents reference psychosocial aspects:

GMC	"apply psychological" and "social science principles"
Scottish Doctor	"understand the role of psychological factors in precipitating and perpetuating illness"
Tuning Project	"assess psychological and social aspects of a patient's illness".

Comparison with otolaryngology literature

Several studies have looked specifically at the perceived importance rating of otolaryngology learning achievements. Similar topics emerge from each as being deemed important and include common topics such as ear infections, rhinosinusitis, throat infections and life threatening conditions such as airway compromise.[43, 85, 86, 97] Skills which were deemed important include neck examination and history taking. Wong *et al.* compared the importance ratings of knowledge versus examination skills and found that generally the ability to perform skills related tasks were rated lower than knowledge elements of the otolaryngology curricula. It is hard to quantify what is meant by this: for example, what does an otitis externa importance rating of 4.75/5 mean compared to an importance rating of 4/5 for neck mass examination?[85] A difficulty with rating the importance of a topic in a survey is relating this to clinical practice. This was alluded to in the free text comments in the pilot study when one respondent said "I'm not sure what average importance is. Doesn't intrinsically make sense to me." In the present study doctors felt that graduates should be able to perform all common otolaryngology examination skills.

Wong *et al.* also found that procedural skills had the lowest overall importance rating compared to knowledge and skill elements.[85] This is in contrast to Lloyd et al who found that grommet insertion and tonsillectomy were rated as 10/10 in importance by participants.[43] Again, however, it is difficult to quantify what is meant by these ratings and to extrapolate them into learning achievements for a curriculum. Generally, in this study, participants felt that graduates should have an understanding of the indications for a procedure. For two specific procedures, nasal packing and nasal cautery, it was felt that graduates should have observed these. This current study showed that participants did not deem it necessary for students to be able to perform any specific otolaryngology procedure by the time of graduation.

Relatively few of the published studies mention head and neck cancer topics as of high importance.[85, 86] Lloyd *et al.* showed "red flag symptoms" were the most important topic related to head and neck malignancy.[43] In the current study, red flags of malignancy received the largest percentage of responses with regards to head and neck malignancy, followed by presenting features and aetiology of head and neck cancers. Far fewer participants indicated that staging, management and prognosis should be in the curriculum. This indicates that the emphasis in undergraduate education with regards to head and neck malignancy lies in diagnosis rather than investigation and management of these conditions.

Two organisations have published curricula relating to otolaryngology, both within the UK.[150, 151] The first is the Royal College of Surgeons of England who, in 2015, published an entire surgical curriculum for use in medical schools. Included within this is a proposed syllabus which includes six 'key surgical conditions' relating specifically to otolaryngology. These were listed as presenting symptoms and were then subdivided into more specific learning objectives. The topics were chosen following discussion with stakeholders. The criteria for including topics included ones which were common or important and where "early recognition and potential surgical treatment" would influence outcomes.[151]

The Student and Foundation Doctors in Otolaryngology (SFOUK) subgroup of ENTUK also published an otolaryngology specific curriculum in 2015 based on a 2014 Delphi study by Lloyd *et al.*[43, 150] The focus of this was on the basic management of "common ENT conditions" and it was designed in such a way that the number of objectives could be varied dependent on the time available within a curriculum.[150] The curriculum objectives were extrapolated from the data from the Delphi study. The learning objectives produced stipulated a level of performance for each objective e.g. "understand the incidence/prevalence, clinical presentations, the management and prognosis of the following ear conditions that present in adults:".[150] This was followed by a list of otological conditions. These levels, however, do not appear to be based on evidence from the study, but rather, produced as a guide to common areas to learn for each condition. They therefore do not take account of the fact that a higher level of performance may be desirable for more common or more serious otolaryngological conditions. In addition, the level of performance as stipulated by a specialist has been shown in this current study to vary in a significant way from that of others working out with the specialty and therefore it is possible that the indicated levels are not representative of what the Delphi survey participants would have intended. The emphasis within both of the above curricula is again focused on common conditions and those which may be life threatening.

Subgroup differences

Two studies briefly examined differences in surveyed groups.[85, 86] In 2009, Wong *et al.* found that undergraduate programme directors were less likely to deem epistaxis management as important compared to doctors in family medicine and community otolaryngology.[85] A survey of otolaryngologists and family doctors in Canada on the importance of certain topics by Carr et al. showed that opinions between the two groups differed significantly in 26% of the 46 topics examined.[86]

Generally, family doctors rated topics at a higher level of importance. Epistaxis and vertigo were topics where there were significant differences. Epistaxis was actually ranked lower by family doctors. The authors postulated that this may be due to a lack of awareness of inadequate treatment due to poor feedback from otolaryngologists and that otolaryngologists may expect a higher level of skill in management for conditions which they commonly treat. In the case of vertigo, it was felt that family doctors rated this higher as they commonly see this condition and the waiting time for specialist referral could be lengthy so by the time the otolaryngologist sees the patient, symptoms may have improved.

In this current study, consultants tended to expect a lower level of performance for most clinical conditions compared to other groups; for example, indicating a student should 'be aware of condition' rather than 'be able to take a history and examine the patient appropriately for this condition'. General practitioners also tended to rate balance topics, e.g. vestibular neuritis, at a higher performance level; 'be able to manage this condition'. A postulated reason to account for these differences includes consultants not being aware of the number of patients presenting to general practice with these conditions or consultants tending to see more complicated cases which are not resolving and therefore interpret these as beyond the scope for which graduates would be expected to manage. Study three will be the first study to look specifically at potential reasons as to why these differences occur. This is important because without an understanding of this, topics may be included or excluded from a curriculum based on inaccurate perceptions.

Throat swabs were the only specific otolaryngology skill mentioned as a required skill both in overall curriculum documents such as the GMCs Outcomes for Graduates and the Scottish Doctor outcomes and in otolaryngology specific curriculum papers.[97, 150] In this present study 66% of general practitioners felt that graduates should be able to perform this skill compared to only 34% of otolaryngology consultants.

Limitations

The low response rate to this questionnaire is acknowledged. It is known that survey response rates from doctors are generally low.[125] In 2014, a British Medical Association (BMA) survey of general practitioners returned a 4% response rate and another on contract imposition returned a 10% response rate.[152, 153] Response rates may vary even within the medical profession with some specialties being more likely to respond than others.[125] Kellerman discusses that one might assume that doctors would be more likely to respond to surveys as they are educated and therefore literate and are likely to have considered the issues arising in the questions already.[133, 154] There are, however, a number of factors which may impede this response which include[154, 155]:

- Issues which are stereotyped in surveys
- Where the survey style is restrictive
- The time taken is too great in an already overburdened workforce
- The number of similar requests received

The 5% response rate in our survey is therefore in keeping with the findings from other UK based physician surveys. Results are felt to be representative of the wider UK doctor population. Responses were received from all main target groups and a range of opinions were elicited. In this study 17.2% of doctors had previously held an otolaryngology post, which is comparable to previous studies which showed 21% of general practitioners had previously held an otolaryngology post.[62] A 2007 survey of Scottish consultants showed that 6% held an educational qualification.[156] Another survey in 2013 showed that, regarding individuals involved in undergraduate education, 25% held an educational qualification.[157] In our study, 21.4% of participants held an educational qualification. Although it is expected that those with an interest in education would be more likely to respond to this questionnaire, it is reassuring for the generalisability of the results that 78.6% of participants did not hold an educational qualification.

Bias may be introduced in any survey during the questionnaire development stage. If the design of a questionnaire is flawed this has significant implications for the interpretation of results. In this study, three inputs were used at the questionnaire development stage to minimise the risk of non-inclusion of items. In addition to this, the questionnaire was piloted to test the questionnaire, ensure validity and obtain information on data quality.

It is acknowledged that the length of the questionnaire may lead to respondent fatigue. The length was, however, deemed necessary to capture the desired data. Efforts were made to minimise the length whilst maintaining the usefulness of the data. During the development stage, the questionnaire was streamlined by reducing included topics through exclusion criteria as outlined in the methods section. The length of the questionnaire was also specifically asked about in the pilot study. Participants indicated that despite the length, they were happy to complete the questionnaire as it was of interest. These points are discussed in more detail in the survey design section of this thesis.

This questionnaire also required participants to select a definitive response (forced choice). This may potentially lead to bias in the results because, if participants are unsure of the terminology or an answer, they must still select an option, and this may not fit with their opinion. This was discussed within the expert group at the development stage particularly as the questionnaire contained jargon which not all participants may be familiar with. It was felt that, as participants had the ability to select a response option which indicated that they felt that a topic should not be included in a curriculum, the participants had an option available to them which allowed them to indicate that they were unaware of a topic. Pilot study results indicated that participants, if faced with a term with which they were unfamiliar, were unlikely to use it in their own clinical practice and would select the option indicating that the item should not be included in a curriculum. In addition, a free text response section was included to allow participants the opportunity to provide additional information.

One further potential source of bias may be due to the locations in which the questionnaire was distributed. The three areas were chosen as they were felt to represent the length of the country. There is however potential that a different setting i.e. more rural, would produce different results due to different population needs. This was considered in the questionnaire development stage. Given that, by their very nature, hospitals and doctors' practices are generally located in more urban areas, the risk of bias is acknowledged but felt to be low. A question specifically relating to the location of work in terms of a rural or urban environment was also included. This showed that 12% of participants identified themselves as working rurally. This data was collected to ensure that doctors working rurally were represented in the results but no further subgroup analysis was undertaken between these groups as part of this thesis. This is a potential area for future study.

Conclusions

In general, the results show that doctors feel that medical students should be able to perform the majority of examination skills. They should also be able to recognise, assess and initiate management for both common and life threatening acute conditions and be able to take an appropriate history and perform an appropriate examination for the majority of otolaryngology clinical conditions but manage only a select few.

The results indicate that the region in which a participant works does not have a significant influence on the opinion of the doctors in this study. There was, however, a large degree of variation in responses dependent on the current post of the respondent.

So, what can be concluded from all of this? Well, from the current literature and the results of studies one and two, it can be seen that:

1. Otolaryngology education varies significantly throughout UK medical schools

2. Doctors feel that undergraduate otolaryngology education is inadequate

3. Common and life threatening conditions are felt to be the most important topics to include

4. Doctors feel that students should be able to perform the majority of otolaryngological examination skills competently

5. Many topics identified by doctors as important are not currently included in undergraduate otolaryngology curricula

6. Perceived learning achievements are felt to be similar throughout the UK

7. A doctor’s current job has an influence on their opinion of undergraduate topics

8. Curriculum planning should take account of the difference in perceived learning needs between doctor groups.

Study three: Focus groups

Introduction

Study three aims to explore the opinions of doctors with regards to otolaryngology in undergraduate medical education. The reason for exploring these areas is to understand why variability exists and to understand what factors may affect curriculum content decisions at a specialty level and what factors influence the differences seen between subgroups so that these may be considered in future curriculum development processes.

Study one showed that there was a great deal of variability in undergraduate otolaryngology curricula in the UK. Previous studies have also shown this variation in relation to teaching time.[55, 56] These previous studies reported a range of compulsory undergraduate otolaryngology placements of 0 to 30 days. One aim of these focus groups was to explore and understand reasons for this variability.

Decisions regarding curriculum content are often made by small groups of specialists.[40, 88, 158] This is not only seen in medicine. A study looking at school curricula in the United States of America noted that it was mainly school principals, with some input from teachers, who devised curricula.[38] Recently there has been a trend towards increasing both the number and the diversity of people involved in curriculum development.[41-43, 105, 159] But what factors influence whether a topic is included within a curriculum? Research within the medical literature is sparse, however, in school age education a number of factors have been identified which influence what is taught. These include a teacher's own priorities, their prior knowledge and skills and their own preferences.[160-162] Study two identified topics and performance levels for these topics which doctors felt a student should have learned by graduation but what influenced these opinions?

Study two also showed that responses regarding the expected level of performance of graduating medical students varied depending on the post of participant, i.e. whether they were foundation year doctors, specialty trainees, general practitioners or consultants. This correlates with previous literature which has shown differences in opinion between doctor groups in both otolaryngology and ophthalmology.[85, 86, 124] Reasons postulated in these studies were a lack of awareness of inadequate treatment due to poor feedback from specialists and that family doctors rated some topics of higher importance as they are commonly encountered by the family physician. It was, however, acknowledged that further analysis in this area was beyond the purpose of their paper.[124]

A qualitative approach was felt to be necessary to explore these areas. Qualitative research can be useful when attempting to gain an understanding of a topic.[163] Focus groups are one method of data collection in qualitative research which aim to elicit discussion within a group which may not occur out with a group setting and are a way of establishing what participants think about a subject.[164, 165] Focus groups can therefore be used to elicit explanations for the results obtained in the preceding studies.[166] These focus groups therefore provide an interesting insight into perceptions surrounding undergraduate otolaryngology education in general and specifically regarding results obtained from studies one and two.

Method

The theoretical perspective taken was one of pragmatism. An inductive approach to thematic analysis was utilised; the data was used to inform the analysis.[167, 168] Thematic analysis was used as a way of "identifying, analysing and reporting" themes from the data.[168(p.6)] Broadly, a semantic approach was used to provide an overview of the main themes. Latent themes were also explored in an attempt to gain further understanding of certain areas of the data.

Recruitment

Foundation year doctors, specialty trainees, general practitioners and otolaryngology consultants were invited to participate based on the aims of addressing questions arising from studies one and two. Non-otolaryngology consultants were not invited to participate at this stage following discussion within the research team. Responses to study two indicated that this group were unsure of providing a definitive opinion on undergraduate otolaryngology questions. In addition, obtaining enough participants to form a focus group from this cohort (i.e. consultants from different specialties) would prove difficult due to logistical reasons. The option of face-to-face interviews was discussed as an alternative but these were not deemed necessary at this time.

Targeted recruitment using a nomination technique was used where possible, with invitations sent by email (*Appendix 6*). Participant information sheets were provided (*Appendix 7*). The nomination technique involves identifying an individual from within the study population, who then nominates further potential participants. This has the benefit of identifying suitable participants who may be unknown to the researcher.[169] It may also aid recruitment due to contact from an individual known to the potential participant.[170] Due to the restricted numbers of potential participants in the otolaryngology consultant group, all otolaryngology consultants from the local area were invited to participate.

Focus groups were homogenous for the current post of the doctor e.g. a foundation year doctors only group. It was felt that this would facilitate discussion within groups, particularly relating to differences in subgroups, and avoid any potential bias due to the risk of perceived power differentials between doctor groups.

Ethical statement

Ethical approval for this study was obtained from the University of Dundee Research Ethics Committee (UREC 15151).

Setting

All focus groups were conducted within the Ninewells Hospital campus in Dundee, United Kingdom. This followed evaluation of sub-groups from study two which indicated minimal differences in responses dependent on a participant's region of work. Each group was coordinated and facilitated by the lead researcher (RS).

In each focus group, participants were provided with A4 sheets of paper containing findings from study two for discussion purposes. Three audio recording devices were used to ensure no data loss. Data was uploaded to a password protected university computer contained within a key card protected office. Prospective notes and observations were recorded throughout the focus groups by the lead researcher (RS). In addition, immediately following each group, further notes were generated and notes taken during the groups expanded upon.

The setting varied for the convenience of each group. The focus group consisting of otolaryngology consultants was conducted in the otolaryngology department of Ninewells Hospital, Dundee during a dedicated afternoon session. The foundation year doctors' focus group was conducted within a teaching room of the University of Dundee on the Ninewells Hospital site. The specialty trainee group was conducted in a resource room of a hospital department and the general practitioner group was conducted in the Tayside Centre for General Practice on the Ninewells Hospital campus. Refreshments were provided for participants both as an incentive to attend and as a thank you for their participation.

Participant information sheets were again provided at the time of the focus groups and consent forms were signed (*Appendix 7* and *Appendix 8*).

Research questions

The focus groups were approached with three main research questions in mind.

1. What factors influence variability in undergraduate otolaryngology education?

2. What factors influence curriculum content?

3. Why do different subgroups of doctor have different opinions on curriculum content?

Structure of focus groups

The format and timings of the different stages of the focus groups are shown below:

0000	Welcome	
0005	Background and consent forms	
0010	Focus group questions	
	Question 1:	Experiences of otolaryngology
0015	Question 2:	Current curricula
	Question 3:	Current curricula
0020	Question 4:	Survey responses
	Question 5:	Survey responses
	Question 6:	Survey responses
0030	Question 7:	Deviations from average response
	Question 8:	Deviations from average response
	Question 9:	Deviations from average response
0040	Question 10:	Procedures
0045	Question 11:	National curriculum
0050	Question 12:	Closing and thanks

Questions were developed to encourage discussion between focus group participants. Texts by Barbour[171] and Silverman[172] were consulted to facilitate a structured approach to the focus groups and address practicalities and considerations of focus groups.

Question one related to the undergraduate otolaryngology experiences of the participants. It was used both as an ice-breaker and to stimulate thinking regarding otolaryngology, specifically relating to the undergraduate level.

Q.1 “I am interested to hear about your own experience of ENT surgery at medical school?”

Further prompts were used throughout the focus groups to elicit more detailed discussion. Some were pre-thought out prompts and others determined by the discussion which took place. Examples for question one include:

“Did the experience have any effect on your current practice?”

“Has this experience affected your views of the specialty?”

“Did you receive any further training in ENT surgery?”

Questions two and three related to current UK medical school curricula and explored reasons for the degree of variability highlighted in study one. Results from study one were explained and the following two questions posed to elicit discussion:

Q.2 “Why do you think there is such a high degree of variability in ENT teaching across the UK?”

Q.3 “Do you see this variability as a good thing or something which should be addressed?”

Questions four to six aimed to explore the overall responses received from study two. Question six linked this back to the results of study one. Results from study two were provided on printed A4 sheets as well as being explained to participants.

Q.4 “Why do you think these three exceptions were rated differently?”

(relating to examination skills results)

Q.5 “Why do you think these conditions were rated at a higher level?”

(relating to acute conditions)

Q.6 “Why do you think this discrepancy exists between what doctors think a graduate should know and what is currently included in ENT curricula?”

(relating to differences between survey responses and current curricula)

Questions seven to nine relate to where the mode response from a subgroup in study two deviated from the responses from other groups. Question seven explored why foundation year doctors indicated a higher level of performance than other groups. Question eight explored why consultants indicated a lower performance level than other groups. Finally, question nine explored a number of topics where general practitioners indicated a different response from other groups. Results from study two were explained to participants and the following question posed for questions seven to nine:

Q.7-9 “Why do you think this is the case?”

Question 10 explored why no group indicated that students should have observed a specific otolaryngological procedure. The following question was used to prompt discussion on the responses received in study two.

Q.10 "I am interested to hear your thoughts on students observing surgical procedures in general?"

Question 11 explored opinion of national curricula.

Q.11 "What are your thoughts on a national curriculum?"

Finally, question 12 allowed participants to voice any further comments which may not have been addressed within the focus group.

Q.12 "Does anyone have any last comments?"

Data analysis strategy

Audio files were uploaded securely to Dictate2us.com for transcription.[173] Following transcription all files were reviewed by the lead researcher (RS) and any mistakes or omissions corrected from the original audio recordings. NVivo qualitative data analysis software was used.[174]

Thematic analysis was then undertaken following principles as set out by Braun and Clarke.[167, 168, 175] Initial coding followed a line-by-line approach to elicit themes from the data. Peer debrief was used to check coding strategies and aid consistency. A sampling technique was used in this case.

Limitations

For logistical reasons the lead researcher (RS) was involved in conducting the focus groups. This potential source of bias is acknowledged and data interpreted with this in mind to minimise any effect that this may have had. As discussed by Barbour, the presence of a researcher within the focus group, even as a non-participant, may have a bearing on the group.[171] An example of where this may be seen in the data includes:

> "Whereas longer experience is definitely showing that it's a very interesting specialty with some good mix of meds and surgery together." [FY2]

Although the same opinions may have been revealed if an impartial person had been running the group there is a risk that this opinion was influenced by the researcher's involvement. No other such obvious examples were noted but this illustrates the potential for bias to exist.

Although it is acknowledged that the involvement of a researcher in research and, in particular qualitative research and focus groups, may influence outcomes in terms of participant responses and loss of objectivity, it is also acknowledged that there are benefits associated with an 'insider researcher'.[176] These include an understanding of the topic, which may benefit the interpretation of data. Additionally, there are benefits of knowing institutions and the people within them which may facilitate the research itself.[176] It is however important for the researcher to be transparent about their role and position within the research as results need to be interpreted in relation to this.[177]

In study three, the lead researcher's understanding of the institutions and departments through which the participants were contacted facilitated recruitment. During the focus groups themselves, an understanding of the topic area facilitated discussion and during analysis, proved invaluable in allowing interpretation of the data in the context of the results from studies one and two.

It is also acknowledged that the focus groups varied in size, particular with regards to the larger number of otolaryngology consultants participating. Recruitment of medical professionals for focus groups is known to present a challenge and a number of factors may aid or inhibit recruitment.[178] Interest in a topic is a motivating factor for participation and this was particularly evident with the response to recruitment from the otolaryngology consultants.[178]

The limited number of focus groups may also potentially impact the findings of study three. Four focus groups were conducted to include the groups of doctors surveyed in study two. These were chosen to gain an insight into the opinions of a range of doctors but also specifically to facilitate discussion regarding differences in responses between subgroups.

In qualitative research, there is debate around how the sample size of a study is determined and 'saturation' is often quoted as a method for doing so.[179] Saturation refers to the point where further data collection does not add significantly to that which has already been collected. It is however difficult to foresee a situation where no further themes could be elicited relating to a specific area at some future point. There is therefore a question surrounding the use of saturation to inform sample size. O'Reilly discusses that sample size should be deemed adequate in qualitative research when the research question has been sufficiently addressed.[180]

In addition to discussions around sample size, logistical issues must also be considered. There may be issues from both a time perspective and from a participant perspective. In study three, the East of Scotland area was chosen as the location for the focus groups. A single location was chosen based on findings from study two which indicated that there was little difference in opinion between doctors between the three sites of study. From a logistical point of view this aided focus group organisation but did limit the number of potential participants. This limitation in potential participant numbers had the potential to restrict the number of focus groups. This had the potential to impact on the breadth and depth of the data which could, in-turn, have an impact on the adequacy of the data used to address the research aims. Throughout the process of designing study three this was considered. Given the stated main aims of study three being the exploration of the opinions of doctors with regards to undergraduate otolaryngology and explaining the results from studies one and two it was felt that the study design was appropriate to do so.

Results and discussion

Four foundation year doctors, seven consultants, three specialty trainees and three general practitioners participated in the respective groups. The final coding framework is shown in *Table 50*.

Table 50: Final coding framework for study three

Theme	Subcategory	Subcategory 2	Subcategory 3
Variability in undergraduate otolaryngology	Why variability exists	No standard curriculum	
		Medical school level issues	
		Department level issues	
		Individuals influence over curricula	
		Evolution of curricula	
		Topics falling between gaps in curricula	
	Positive aspects of variability		
	Negative aspects of variability		
Factors influencing curriculum content	Factors related to otolaryngology topics	Serious	
		Common	
		Examination skills	
	Relating to future work		
	Career intentions		
	Assessment		
Exploring subgroup differences	Region		
	Current post of doctor	Perception of condition or its management	Definition of management
			Complexity of case
			Experience of participant
		Expectations	
		Overplaying one's own skill level	
		Availability of resources	

The findings and discussion are amalgamated to aid understanding. These are presented in relation to the research questions.

1. Why is there variation in undergraduate otolaryngology throughout the United Kingdom?

The variation in undergraduate otolaryngology was discussed by all focus groups. A number of theories emerged as to why this may occur. These can be split into issues at different organisational levels, from individuals in departments through to a lack of curriculum standardisation. The natural evolution of curricula and the potential for topics to fall between specialties were also discussed.

No standardised curriculum

The lack of a standardised curriculum in the UK was mentioned on a number of occasions. It was the perception that the lack of standardisation accounted in a large way for the variability in curricula. One participant remarked that the reason for variability was “Because there’s freedom to have it…. there is no curriculum, there is no standardisation.” [Cons6]. This was despite an awareness in the same group that the Royal College of Surgeons of England has recently published a surgical curriculum incorporating otolaryngology topics[151]: “you may have seen the document that just came out from the College of Surgeons about the six things in ENT as the basis of undergraduate curriculum” [Cons7].

It was noted that “variation can be very good for some people but can also be very bad and is one of the key components of leading to mistakes and accidents being made, whereas standardisation is a proven method of reducing error.” [FY3]. This is linked directly to patient safety: “what we’re trying to achieve is patient safety. So aiming for a minimum standard of ENT teaching where you can expect a medical graduate to manage a patient safely" [FY5]. This variability has been well highlighted in study one and by others in otolaryngology.[55, 56] The General Medical Council acknowledge that variety exists but state that schools should "conform to a basic set of principles.".[181] To what extent these principles relate to curriculum standardisation is open to interpretation, however, the General Medical Council do list curriculum documents from specialties within their Outcomes for Graduates document appendix.[2]

Medical school level

At the level of medical schools, there was a perception that otolaryngology was not recognised as a subject which required attention: "institutionally, they never look at ENT as a surgical specialty that needs attention." [Cons4]. Evidence going back to the 1960's shows that there was a feeling amongst otolaryngologists that the subject was underrepresented in medical schools. This was linked directly to an underrepresentation of the subject in final examinations.[74] There was a feeling that the 'big' subjects of the day, general medicine and general surgery, were overly dominant and this perception is still evident from remarks from the focus groups:

"So my medical school, they put a huge emphasis on general medicine and general surgery to the detriment of specialties and sub-specialities like ENT and dermatology and stuff like that." [ST2]

"And we think of ENT as a specialty as relatively small in the grand scheme of things…" [ST3]

There was, however, a realisation that the reality of designing a medical school curriculum is not easy; "I don't think it's as much what ENT has to offer the undergraduate, it's that all the other things need to be taught to the undergraduate as well." [ST2] and that external factors also have an influence on the composition of curricula. It was discussed that the expansion of curriculum topics, such as the inclusion of communication skills has meant that "so much time is spent in aspects like that, that a lot of the systems of specialty learning, I think, has diminished." [ST3].

Departmental and individuals influence on curricula

The influence of departments and individuals within departments was also discussed in depth. It was felt that from a departmental level, resource allocation played a large role in the variability seen. Funding and time were identified as key factors in a department's ability to provide teaching. "…people are not that motivated about teaching the undergrad especially when there's no money or time involved." [Cons2] With the ever increasing pressures on funding, the time available for teaching and curriculum development may be at further risk.[182]

The numbers of students to be taught was also seen as a limitation within departments:

"I think the biggest difficulty is sort of resource allocation. Some universities have 200 to 300 students in a year and there's one ENT Department serving that whole student population." [FY2]

"…it comes down to a ratio between the number of teachers and the number of people being taught." [Cons5]

It was also noted that priorities within departments themselves may vary: "research was the big thing… If you look at the actual teaching that was going on to the medical students, it was pretty patchy…" [Cons2]

The enthusiasm of individuals within departments was seen as a key attribute which influenced undergraduate otolaryngology: “depending on how enthusiastic they are as an ENT in a whole and how enthusiastic they are in teaching” [FY2]. There was, however, a general feeling that one of the biggest determinants as to what is included in a curriculum was who is in charge and what their own area of interest was: “…depending on who’s in charge of the department’s obviously going to have a bias to their own subspecialty” [FY2]. Some even felt that this was the main factor in determining what was taught “I think its individuals rather than anything else.” [Cons2].

It was felt that instructors “can’t really separate your own personal interests from work interests all the time.” [FY2] and that this may be a result of “accidental bias” [FY2]. This was linked by some to the fact that “…most medical teachers are not professional teachers. They’re medical professionals who happen to teach and people who have an interest to design curriculum who are not experts at it.” [GP2]. This is an area in which the General Medical Council are working to address with the recognition and approval of trainers.[183]

Evolution of curricula

One other factor identified which may lead to variation in curricula was that “medical curriculum have evolved… it’s not like sitting down today and designing a medical curriculum” [GP2]. This evolution has led to curricula from different medical schools diversifying. Factors influencing this diversification include resource limitations and areas of particular interest within departments.

Topics falling between gaps in curricula

A final area that was mentioned was that a topic may be covered by more than one specialty: "…periorbital cellulitis. It's probably covered in ophthalmology." [Cons3]. This creates the potential for topics to slip between gaps, where nobody takes responsibility for including a certain topic within a curriculum. The story of four people illustrates this point nicely[184]:

> There are four people named Everybody, Somebody, Anybody and Nobody.
>
> There was an important job to be done and Everybody was asked to do it.
>
> Everybody was sure Somebody would do it. Anybody could have done it but Nobody did.
>
> Somebody got angry about that because it was Everybody's job.
>
> Everybody thought Anybody could do it but Nobody realised that Everybody wouldn't.
>
> It ended up that Everybody blamed Somebody when Nobody did what Anybody could have done.

Influences over curriculum content and teaching are therefore seen to be multifactorial. Even when curriculum directives are in place, studies have shown that many factors influence whether these are actually delivered to the student; the curriculum in intention does not always equal the curriculum in action.[107, 162]

Research has shown that generally teachers do not teach strictly to the curriculum even when curriculum directives are in place.[160, 161, 185] Teachers tend to balance curriculum directives with their own priorities. Factors which may influence these priorities include their own knowledge, skills and their own preferences.[162] The school or area in which a teacher works can also influence what they teach. This is thought to be due to factors including the students to be taught, the subject matter and the curriculum objectives themselves.[162]

A study looking at the teaching content in mathematics classrooms found that even if curriculum objectives were in place, these were often ignored by the teachers or interpreted in different ways.[186, 187] Situational constraints, prior experience and prior education are among some of the factors which have been shown to influence how curricula may be interpreted. For example, Kaufman showed that newly qualified elementary school teachers tended to use curriculum materials to help with planning but that the extent to which they were used varied greatly.[188] Further to this, deciding what to teach poses a challenge to teachers, particularly at the start of their careers when they lack experience with this type of decision making.[189] It has been suggested that in these circumstances that the published curricular material should be utilised to aid these decisions.[162] This has implications for writing curricula but also for the interpretation of study responses.

Additionally, pressures to conform with existing assessments within a single organisation may put curriculum content decisions at odds with the pre-determined objectives from an outside organisation.[188] This has implications for a medical licensing assessment, such as the one proposed by the General Medical Council, and how this might be integrated into existing assessment frameworks.[190]

Of interest, no participant mentioned significant external factors such as political or regulatory directives in their discussion about curriculum content despite this being a recognised factor in curriculum policy making. For example, in schools this may include local education authorities and for medical schools, organisations such as the General Medical Council.[2, 191] This may be due to the discussion centring on specialty specific curricula rather than a broader medical school curriculum, however, it is perhaps encouraging to see that it is the perceived needs of the students which appears to be the driving force behind decisions on curriculum content.

2. Factors influencing curriculum content

A number of factors were identified which may influence what is included in a curriculum. These include ones related to otolaryngology topics themselves, factors related to the future work of medical students and factors relating to assessment.

Participants indicated that serious and common conditions were important to include which correlates with findings from study two (triangulation), from other quantitative studies looking at otolaryngology topics in curricula and from recommendations in curriculum guidelines.[2, 35, 43, 97] A foundation year doctor commented that they think that the conditions which graduating students should be able to manage are, “either the ones who are very common or ones who are very severe even if they’re uncommon.” [sic] [FY5] The participants discussed that they felt that it was important to be able to manage a serious condition because “…not being able to manage it could be detrimental to the patient.” [FY5] indicating that potential harm is a driver for content inclusion decisions. Upper airway obstruction was used as an example of this “because it's an acute life-threatening event, so that's the one that's going to kill you first” [ST3].

The level of complexity in managing patients was also a factor in deciding the performance level of graduates: “Some of the tonsillitis and epistaxis is a relatively simple thing that the doctor on the ward can easily implement without senior support...” [FY3] and “tonsillitis is extremely common, relatively straightforward to manage initially” [ST3]. A foundation year doctor linked this to when a “guideline can be clearly drawn up...” [FY3].

General practitioners also linked their expectations of graduates to what they thought was manageable in their own practice: “minor epistaxis, I would manage that in practice.” [GP2]. Another participant made the link to the skill level of the graduate i.e. were additional skills, such as surgical skills, required: “I wonder if it's just because some of it you could manage without being like a surgeon” [ST4].

Examination skills were discussed as a key area for inclusion. Curriculum guidelines also emphasise the importance of this topic.[2, 35] Study two showed that doctors felt that graduating medical students should be able to perform the majority of otolaryngology examinations. The focus groups revealed that equipment availability and the perception of a skill advanced were limiting factors in what was expected of students: “I think GPs should know almost all of this except laryngeal internal examination which they have nothing, no tools to look at.” [Cons4]. This also indicates that this participant links undergraduate education with preparing students for a career in general practice. The technical difficulty of a skill also appeared to influence response: “for students to learn laryngeal examination is asking a lot because it’s more difficult.” [Cons6].

Related to their own clinical experience, a general practitioner reflects that in “managing 14 years with ENT patients… I seem to have not missed anything in my case.” [GP4] with regards to not being able to do a laryngeal or Dix-Hallpike test specifically. Prior experience has previously been shown to have an influence on what is taught.[187]

There was also a feeling amongst general practitioners that for some of the examinations they "wouldn't do enough of it to maintain the skill." [GP2]. The frequency that a skill would be performed was also mentioned by specialty trainees: "it should be something that they should be able to use you know, if they're called upon to do it daily, for example, as a GP" [ST2].

Study two showed that for general clinical topics, the level of performance expected of students was generally lower than for acute clinical topics. For the majority of topics, the level related to an ability to take a history and examine a patient appropriately for a condition. Participants in the focus groups agreed with this and postulated that graduates should "…know properly or at least safely enough that they can pick out something bad that needs referral." [ST2]. A pre-requisite of this is clearly to be able to take a history and examine a patient to be alerted to the potential need for referral. The Scottish Doctor outcomes document states that students should have the "ability to recognise the need for specialist help, appropriate environment and the speed with which these two are required".[35]

There was a feeling amongst participants that the skills learned at medical school must equip them with the "skills to be safe on day one" [Cons4] and for a potential future career in general practice: "a medical school should churn out medical students that are safe basic junior doctors/GPs." [ST2] and "60% of us will become GPs" [FY3].

There was, however, an acknowledgment that "40% of us are not going to be GPs." [FY5] and this linked to participants feeling that exposure to otolaryngology as a specialty was important for recruitment to the specialty. One foundation doctor remarked that surgical exposure "can be a good way to develop an interest in becoming a surgeon" [FY4] and another that "longer experience is definitely showing that it's a very interesting specialty" [FY3], which also appeared related to the postgraduate experience of the participant. One consultant felt that “if I didn’t go to ENT theatre, I probably wouldn’t have become an ENT surgeon” [Cons4]. There is currently a decline in recruitment to surgical specialties, including otolaryngology. It has been shown that exposure to specialties may have a positive influence on recruitment.[147, 192-194] Therefore, the benefits of recruitment appear apparent to doctors both from a point of view of specialists wanting to encourage students into their specialty but also from students wanting the opportunity to experience the specialty.

There was also the perception that assessment drives learning and as such curriculum content should, in some way, be tailored to what would be expected in examinations. Foundation year doctors in particular linked the two. They discussed the proposed new national licensing assessment in the United Kingdom as a way of creating a national standard for graduates: “With... the national licensing exam, surely everyone should have a… there should be a national minimum standard for every doctor” [FY2].

3. Why do subgroups of doctors have different opinions on curriculum content?

Region

The location of a participant’s place of work was not discussed in any detail by any of the groups as a differentiating factor for curriculum content. It was mentioned in passing by one participant who commented that “the level of expectation might depend on the centre.” and that in the centre where they currently worked they “are expected to do quite a lot.” [FY4]. Despite prompting, no further discussion around location as a determinant of curriculum content was mentioned. This is in keeping with the results from study two which showed that there was very little difference in the responses from doctors’ dependent on the region in which they worked.

Current post of doctor

With regards to discussion relating to the significantly different responses which were seen in study two depending on the current post of the doctor many themes emerged.

The perception of a condition or its management

There was discussion around what doctors meant by ‘management’ of a condition. Both foundation year doctors themselves and other groups commenting on foundation year doctors felt that foundation year doctors were more likely to perceive that management referred to the initial or generic steps of management: “So immediate management would be A, B, C, D, E” [FY2] and “potentially why the juniors always thought that they should be able to manage a condition is that basic interventions are always possible at a junior level, of starting antibiotics, of putting in a line… even before the surgeons even called” [FY3]. This may have manifested in the foundation year doctors’ responses to the questionnaire (study two) in that they would be more likely to indicate the need for a higher level of performance for graduates because their perception of what management entailed was one which they, as foundation year doctors, felt capable of.

Similar views were expressed to explain why general practitioners and consultants had expressed different responses. It was felt that “maybe it's because what they think is managing is not what an ENT consultant would class as managing.” [ST2]. Using an example of laryngitis, a consultant states “…if you say laryngitis, I think a lot of different things… well, that is a complex area.” [Cons4], whereas on the very same topic a general practitioner stated “do you ever send laryngitis to a consultant unless…” [GP2]… “well, it’s more if they’ve got chronic hoarseness…” [GP4] stating the reason for this is that “It’s what we do all the time. It’s a regular part of our work” [GP2]. Overarching all of this is that groups tended to correlate the perceived performance level of a graduate with that of either a foundation year doctor or general practitioner as previously discussed.

This led to participants, not only discussing the term management but what they felt able to manage and how they would decide this. As noted in the above quote, general practitioners related this is to common topics, the things which they see all of the time. A foundation year doctor commented that “from a junior perspective we see the most simpler things that we can initiate.” [sic] [FY5] whereas “the ENT consultant will only be seeing the resistant ones which the GP hasn’t managed to manage on their own.” [FY3].

Participants from different subgroups commented on how the experience of the other groups may affect the opinions of that group. It was felt that foundation year doctors would be influenced by things which they “regularly see on the wards.” [GP4]. The general practitioners did however acknowledge that, in terms of foundation year doctors, the general practitioners may not be aware of “what it is that, in terms of cases, that they’re dealing with on a regular basis” [GP4]. Both foundation year doctors and general practitioners themselves commented that “GPs have exposure bias to a certain type of patient” [FY5] and “I suppose as a GP we have different skew of what we see.” [GP3].

Expectations of participants

The expectations of doctors were also seen as a factor accounting for the difference in responses between subgroups. This was in terms of both the high expectations of foundation year doctors, who related their own performance level to that of a graduating medical student, but also in terms of the expectations of more experienced doctors regarding graduates.

It is well documented that peers tend to be harsher than others when assessing each other. A study by Risucci *et al.* of surgical residents showed that ratings by peers were lower than those of supervisors.[195] Wadhwa looked at peer assessment in graduates of a research methodology course and found that peer assessors, particularly if anonymous, provided a significantly higher number of critical comments.[196] With foundation year doctors appearing to associate themselves closely with the level of graduating medical students it may be that the reason that they indicated a higher level of performance in study two was that they are being more critical of their near peers. This is reflected in the experience of one participant with regards to essays they have marked: “The junior doctors are, or the fifth year medical students are, by far the harshest markers and have set the highest standards” [Cons2].

There was also a feeling that foundation year doctors indicated higher levels of performance in an attempt to conform to what they thought was correct. A specialty trainee commented that foundation year doctors “think that you should know more than you maybe actually do at the time, so you're maybe kind of pretending that yeah, I would know how to manage all of those.” [ST4]. It was also felt that the response “represents a potential false confidence. And junior doctors, they come out there thinking they should be able to do all of this, when in reality, they shouldn't or can't.” [ST3].

The foundation year doctors in the focus groups, however, indicated some surprise at the questionnaire results which had shown their subgroup tended to indicate a higher level of performance. They postulated that this may have been linked to a perception that more senior doctors were from an era when they were expected to do more: “Surely in their generation some of these consultants of 30, 40 years… would’ve been at a time when junior-led care was the mainstay of care.” [FY3]. This perhaps indicates that there was indeed an element of trying to conform to what they felt were the expectations of more senior doctors.

Research has shown that even in private situations there is a tendency to conform.[197] Crutchfield’s 1955 study showed that participants were more likely to conform when they were aware of the responses of others, even if these were incorrect. Despite this current study being anonymised, foundation year doctors themselves indicated that this may have been the case when a participant stated that “…if you give them a list of things that someone says, “These are a list of conditions,” and you look down and you go, ‘Well I only know half of these. I probably should’ve known three quarters of these.’ It might be… (a) false impression of what you should and shouldn’t know” [FY2].

Overplaying one’s own skill level / availability of resources

We can see from the previously included quotes that there was a feeling that foundation year doctors were overplaying their actual level of skill e.g. “junior doctors, they come out there thinking they should be able to do all of this, when in reality, they shouldn't or can't.” [ST3]. We can also see that foundation year doctors and general practitioners link their expectations to the perceived needs of their jobs e.g. ““minor epistaxis, I would manage that in practice.” [GP2]. In these cases in particular it is important therefore to consider self-assessment of performance and how this relates to actual behaviour i.e. it is fine to say one thing, but how does this relate to reality?

A number of studies have looked at self-awareness in relation to skill level. Views of oneself often show little relationship to actual performance and behaviour.[198] Gordon reviewed 18 articles looking at self-assessment in health professions and Falchikov and Boud performed a meta-analysis of self-assessment in students in higher education [199, 200]. Both studies showed that self-assessment poorly correlated with the judgement of others. More specifically, Risucci *et al.* looked at surgical residents' examination scores and showed that they were a poor judge of their own level.[195] Tracey *et al.* studied general practitioners' self-assessment of knowledge and showed that it did not correlate well with their test scores.[201] Therefore, with foundation year doctors appearing to correlate expectations of graduates closely to what they themselves believe their level of performance should be, some caution must be exercised in interpreting their views.

These attitudes do, however, risk discrediting the opinions of foundation year doctors and not fully acknowledging that their current experience may dictate that different skills are needed for future medical graduates following behind them. One consultant states that "do the medical students know what they need to know?... people who know, have been educated, need to tell them…" [Cons2]. A general practitioner also commented "They've not yet got the wisdom to sometimes know but you have to learn these things…" [GP3] in relation to foundation year doctors assessing their own level of need.

It is recognised that one problem with self-assessment scores is that they assume that the gold standard, which is the expert or assessor, is correct.[202] In medicine, a senior member of the team (or curriculum developer) is often seen as the expert. With the constant changes seen in medical practice however, some caution must be exercised in dismissing foundation year doctor curriculum opinions as, as noted above, they may have a greater understanding of the needs of a graduate than the more senior members of the team.

Participants also proposed that general practitioners may have indicated a higher level of performance for some topics because they were thinking about graduates pursuing a career in general practice and the implications of not being able to manage these conditions. One implication which was muted was the need for referral if a general practitioner was unable to manage a condition and that this “will cost the GP's practice money…” [ST3].

A specialty trainee proposed that consultants may feel that general practitioners were overplaying their skills in management “because what they think is managing is not what an ENT consultant would class as managing. So as they think it's going to be easy to manage, an ENT is saying, well actually, he doesn't have a clue how to manage it and there's far more to it…” [ST2]

It was proposed however, that consultants may have other motives for rating their perception of performance levels lower. It was suggested that “…they're inflating their own abilities to the point where only I can manage otitis externa because it's so complicated” [ST4] and that “they're trying to preserve their own specialty.” [ST2] or that “they suspect the juniors will manage the conditions inappropriately and they'll be left with dealing with the consequences” [ST3]. Consultants also felt that it was perhaps “because they’re so into their specialty, they think otitis externa, suction clearance, microscope…” [Cons7]. Related to this, foundation year doctors felt that specialists may have more options open to them, commenting that “I think as a specialist, you most probably think about what you can do because you’re the specialist.” [FY5].

Further topics

A number of other topics emerged from the focus groups which were not the primary focus of this study but which form interesting areas for future study. These included:

1. Where otolaryngology is taught and who teaches it
2. The place for surgery within the undergraduate curriculum
3. The impact that a national licensing assessment and moving the point of registration to the point of graduation may have on the curriculum.

Conclusions

Study three aimed to explore the opinions of doctors regarding undergraduate otolaryngology and relate these to the findings from studies one and two. The focus groups have shown that variability in current undergraduate otolaryngology curricula is multifactorial. Factors include; a perception that otolaryngology was underrepresented at the undergraduate level, no standardisation of curricula and the importance of the enthusiasm of individuals and availability of resources within departments.

The focus groups highlighted that the perceived importance of a topic was an influencing factor in the questionnaire responses and that this was linked to the perceived seriousness of a clinical condition, the complexity of the case and whether it would be possible to manage the condition in a general practice setting. Participants felt that topics included in a curriculum should equip graduating students with the ability to function on day one as a qualified doctor but also for a future career in general practice.

Study three has also shown that differences in opinion between doctor groups, e.g. foundation year doctors, consultants, etc, may be attributed to how different doctors interpret terminology, for example, what is meant by the 'management' of a condition. The expectations which different doctor groups place on medical students also help explain differences in responses in study two. This further emphasises the need to consider the opinions of a variety of doctor groups when developing undergraduate specialty curricula.

Conclusion

Utilising a mixed methods approach we have been able to show the large degree of variation in undergraduate otolaryngology curricula, define performance levels for graduating students and have explored and explained some of the factors influencing this subject. Study one highlighted the variability which exists in terms of otolaryngology curriculum content and provided learning outcomes and objectives which informed the content of the questionnaire in study two.

Following completion of a pilot study, a national survey was then undertaken. This has shown that a consensus can provide useful information for informing curriculum content decisions. In the United Kingdom there appears to be general consistency across regions in terms of the opinions of doctors on the expected level of a medical graduate, however, significant differences exist between doctor groups.

Performance levels have been defined through a multi-site, heterogeneous doctor consensus. These vary dependent on the topic. Results show that a higher level of performance is desirable for examination skills and common and serious acute conditions. In general, the ability to take a focused history and perform an appropriate examination is deemed acceptable for the majority of other otolaryngology topics. Identification of potential head and neck cancers was deemed more important than knowledge regarding staging and management.

Focus groups revealed that variability in undergraduate otolaryngology may occur for a number of reasons. These may relate to individuals within departments responsible for specialty teaching through to organisational reasons such as a lack of standardised curricula. It was felt that curriculum content was influenced by the perception of a condition as common or serious and whether a topic related to the ability to produce doctors capable of functioning in their first jobs and for future careers as generalists.

Differences in the response between groups of doctors based on their current job may be explained by how a group of doctors (for example foundation year doctors) define what is meant by a condition or its management, the complexity of the case and the prior experience of the doctor. The expectations of doctors, in terms of what they would expect of a graduate, also influenced subgroups, with foundation year doctors tending to expect a higher level of performance from graduates.

So, how can this be summarised? It is hoped that the results of this study may help influence curriculum development, both in terms of curriculum content and how curricula are designed, particularly in relation to who is involved. It has been shown that different groups of doctors have different perceptions of the expectations of students and indeed, the very perception of what is meant by a condition or its management. It is therefore vital to utilise a collaborative approach during curriculum development, as not doing so, significantly risks the exclusion of important topics. These findings may be extrapolated to other specialties and have implications for curriculum development in general.

This study utilised a longitudinal transformation approach to mixed methods research, which involved sequential studies to address the research question and aims. This had the advantage of ensuring robust survey development and enabled questions arising from the preceding studies to be addressed using qualitative techniques to aid explanation of results.

Two elements of this study which proved invaluable were the subgroup analysis and qualitative data collection. In addition to the subgroup analysis providing evidence for the need for a collaborative approach to curriculum design, the subgroup analysis may also be useful for medical schools developing curricula with a specific focus i.e. general practice. By highlighting topics deemed important by specific doctor groups, curricula may be developed with this desired focus at the centre of the curriculum. It is anticipated that similar findings would be seen in other undergraduate specialties and therefore when developing curricula, subgroup analysis is recommended. The qualitative data obtained was also invaluable at highlighting why differences occurred between doctor groups and therefore, curriculum development processes should be encouraged to incorporate qualitative elements in their needs assessment processes to better understand the requirements of the intended learners.

The research question, devised at the outset of this project, was “what should medical students learn about otolaryngology?”. Previous studies have identified topics for inclusion in undergraduate otolaryngology curricula. In this study, the aim was to move beyond topic identification and define performance levels for graduating medical students. These have been identified through a nationwide questionnaire.

Given the numerous terms used to describe ‘learning achievements’, differences in medical school’s resources and differences in approaches to the curriculum in different medical schools, specific achievements have not been specified in this document. Additionally, although it may be possible to generalise regarding the expected performance levels for medical students, it is acknowledged that different curricula in different medical schools may have a different focus i.e a rural or primary care focus. Therefore, a specific curriculum document has not been produced. It is envisaged that the data obtained through this study is considered at a local level and can help inform a medical school's curriculum and guide assessment processes.

Recommendations

1. A curriculum should be created to define a nationally accepted standard for specialties

   A lack of standardisation was identified as a cause for curriculum variability. Additionally, in view of the likely introduction of a national licensing assessment, specialties should ensure that nationally agreed standards are in place. Following identification of clinically important topics, specialties should define performance levels for graduating medical students. This research describes one method for doing so. National consensus meetings involving a variety of doctor groups should then be undertaken to discuss how topics fit within the overall undergraduate curriculum. Resource and time limitations create significant barriers which should be addressed through further work in these areas.

2. A collaborative approach should be adopted in specialty curriculum development

   Results from this project show that opinions between doctor groups vary in relation to topics to include in undergraduate curricula and the perceived level of performance required of graduating medical students. A collaborative approach to curriculum development is therefore essential to ensure that topics deemed important by one doctor group are not inadvertently excluded. Curriculum development projects should therefore include a range of doctors, both in terms of the level of doctor e.g. foundation year doctors and consultants and the specialty of doctor. Although the involvement of a larger number of people in the curriculum development process has financial and time implications, this research has highlighted the importance of a collaborative approach in curriculum development.

3. A regular collaborative review of specialty curricula is recommended

   Curriculum content is subject to change due to advances in the field of medicine, changes in populations needs, changes in the standards and guidance set for medical education and the aims of individual medical schools. It is therefore important that a regular review of specialty curriculum is undertaken to ensure that topics remain relevant. Student feedback and regular review of specialty curricula by a heterogenous panel of doctors will ensure curricula are kept up to date.

In otolaryngology there should be a focus on:

4. A student’s ability to perform examination skills

5. Common and serious acute conditions up to the initial stages of management

6. History and examination skills in general otolaryngology topics

7. Identification of potential head and neck cancer

Direction of future work

1. How is otolaryngology teaching delivered, where it is delivered and who is involved?

   The focus of this project has been on curriculum content. Study one highlighted the variability in this content throughout the U.K. but also highlighted differences in teaching methods. Otolaryngological conditions present to a variety of specialities, e.g. general practice, acute care and paediatrics. It would be of interest to examine how other specialties contribute to the otolaryngology education of medical students. It appears that there may be a significant contribution from allied specialties. By recognising this contribution, specialties could work together to ensure that duplication is present only when desired and that intended achievements are aligned to the overall medical school curriculum. There may also be added benefits to students including exposure to cross-specialty working which is an increasing part of working in medicine.

2. Define the resource implications for undergraduate otolaryngology education.

   The implementation of any of the recommendations outlined above or any proposed curriculum changes have implications in terms of resources. Before these recommendations can be implemented, these implications must be explored and considered.

3. Define barriers to undergraduate otolaryngology and possible solutions.

   In addition to resource implications, it is likely that there will be additional barriers to implementing curriculum changes. These may vary between medical schools, but common themes are likely to emerge. By identifying barriers, solutions can be sought, thereby aiding the implementation of the above recommendations.

4. Explore the impact of a national curriculum and national licensing assessment.

   Implementing a national undergraduate specialty curriculum may have implications for organisations and departments. Additionally, the introduction of the national licensing assessment may have implications for specialty curricula. Both would require a degree of standardisation. It would therefore be important to explore the benefits and drawbacks of a standardised approach prior to implementation.

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Appendices

Appendix 1: List of presentations

Appendix 2: Pilot study invitation letter

Appendix 3: Pilot study feedback form

Appendix 4: Final survey

Appendix 5: Screen shot of online appearance of questionnaire as seen by participants

Appendix 6: Focus group invitation emails

Appendix 7: Focus group participant information sheet

Appendix 8: Focus group consent form

Appendix 1: List of presentations

Dizziness

Hearing loss

Otalgia

Tinnitus

Otorrhoea

Facial palsy

Blocked nose

Facial pain

Rhinorrhoea

Disturbance of taste

Disturbance of smell

Cough

Dysphagia

Hoarseness

Lump in throat

Neck lump

Shortness of breath

Sore throat

Stridor

Stertor

Odynophagia

Foreign body

Mouth ulcers

Skin lumps

Appendix 2: Pilot study invitation letter

ENT undergraduate curriculum: pilot

Dear Colleague,

As the field of medicine continues to expand it is important for us to ensure that what we teach is up to date and relevant for the doctors of the future.

In an attempt to provide an evidence base for what is taught to medical students, our aim is to collect data about core elements of knowledge, skills and attitudes used by practicing doctors which are pertinent to the study of ear, nose and throat surgery at an undergraduate level.

In this pilot study, the aims are twofold. Firstly, the data collected will be used to develop an undergraduate ENT curriculum. In addition, the pilot study aims to establish if the questions that are asked are appropriate and useful and if the survey is acceptable to the participant prior to a larger, nationwide, roll out.

Therefore, we would be most grateful for any feedback, comments or suggestions regarding the survey. Ideally, the questionnaire should be repeated in 1-2 weeks to ensure that the survey produces reliable results. We understand that your time is precious but would be most grateful if you are able to do this.

The link to the online survey is https://dundee.onlinesurveys.ac.uk/entcurriculumpilot. Once you have completed the survey, I would be most grateful if you could complete the feedback form attached. The feedback forms can be completed electronically or on paper.

Many thanks in advance for your important contribution to this project and if you have any questions please do not hesitate to get in touch.

Yours sincerely,

Richard Steven

Appendix 3: Pilot study feedback form

ENT undergraduate curriculum: pilot questionnaire feedback

Introductory sections

Are the questions understandable?	Yes	No
Do the options allow you to respond as you would like?	Yes	No

Comments ____

____

____

Background information

Are the questions understandable?	Yes	No
Do the options allow you to respond as you would like?	Yes	No

Comments ____

____

____

Examination skills

Are the questions understandable?	Yes	No
Do the options allow you to respond as you would like?	Yes	No

Comments ____

____

____

Acute conditions

Are the questions understandable?	Yes	No
Do the options allow you to respond as you would like?	Yes	No

Comments ____

____

____

Investigations

Are the questions understandable?	Yes	No
Do the options allow you to respond as you would like?	Yes	No

Comments ____

Procedures

Are the questions understandable?	Yes	No
Do the options allow you to respond as you would like?	Yes	No

Comments ____

____

____

Psychosocial

Are the questions understandable?	Yes	No
Do the options allow you to respond as you would like?	Yes	No

Comments ____

____

____

Clinical conditions

Are the questions understandable?	Yes	No
Do the options allow you to respond as you would like?	Yes	No

Comments ____

____

____

Overall impression

Length of time to complete	_________ mins	
Were the instructions easy to follow?	Yes	No
Was the order of the questions appropriate?	Yes	No
Do you feel that the content of the questionnaire adequately represents undergraduate 'ear, nose and throat' topics?	Yes	No
Overall, was the survey acceptable to you?	Yes	No

Any additional comments

____

Many thanks once again.

Appendix 4: Final survey

University of Dundee

Ear, nose and throat undergraduate curriculum

Page 1: Welcome

As the field of medicine continues to expand it is important for us to ensure that what we teach is up to date and relevant for the doctors of the future.

This national collaborative project, with the approval of the ENTUK undergraduate curriculum development team, aims to provide an evidence base for what is taught to medical students by collecting data about core elements of knowledge, skills and attitudes used by practising doctors which are pertinent to the study of ear, nose and throat surgery at an undergraduate level.

We invite you to become involved with this project and follow its progress and welcome any input and feedback.

Thank you for your support in shaping the education of the doctors of the future.

Page 2: Information

We want to assure you that all data collected in this survey will be held anonymously and securely.

The terminology used within this survey comes from current ENT curricula from UK medical schools.

Participation is entirely voluntary and all responses are anonymous. The survey takes around 10-15 minutes to complete. A link is available on the final page to enter the draw for one of four £25 Amazon.co.uk vouchers.

Once your survey is complete it may not be possible to identify and remove your responses due to anonymisation of data. By clicking continue you are agreeing to participate in this study.

The University of Dundee Research Ethics Committee has reviewed and approved this study.

If you would like any further information regarding the project please contact r.steven@dundee.ac.uk

Note that once you have clicked on the CONTINUE button at the bottom of each page you can not return to review or amend that page

Page 3: Background information

1. Current post / job

1.a. If you selected Other, please specify:

5. If consultant or trainee, which specialty?

2.a. If you selected Other, please specify:

3. For non-ENT doctors, have you previously held an ENT post? *Optional*

- Yes
- No

4. Do you hold any qualifications related to education?

- Yes
- No
- Currently studying towards

5. Do you currently hold an education post (either stand-alone or as part of your contract).

Yes	No
◌	◌

6. At which university did you complete your undergraduate medical training?

7. In which region do you currently work?

7.a. If you selected Other, please specify:

8. Which of the following best describes your location of work?

Urban	Rural
◌	◌

12. Please indicate if you agree or disagree with the following:

	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
Current undergraduate ENT teaching is adequate					
There is a need for ENT teaching in the undergraduate curriculum					
There would be value in a national ENT curriculum (to act as a guide)					

10. Please use this space to enter any comments you may have at this point about any of the above. Further space is provided at the end of the questionnaire if required. *Optional*

Page 4: Examination skills

Examination skills

11. Please indicate the level a newly qualified doctor at the point of completion of their trai…

nasal cavity			
oral cavity			
throat			
larynx			
neck			
salivary glands			

12. The ability to perform:

	Not required	Should know about	Should be able to perform
Otoscopy			
tuning fork tests (Weber and Rinnes)			
Romberg's test			
Dix-Hallpike test			
Unterberger's test			
a test of hearing (eg whisper test)			

Page 5

We invite you to consider first whether you feel that a topic should be included within an undergraduate curriculum and then if you feel that it should be, to what level a newly qualified doctor at the point of completion of their training should know.

Page 6: Acute conditions

13. With regards to **ACUTE** ear, nose and throat conditions, a newly qualified doctor at the point of completion of their undergraduate training should:

	Not be required to know of the condition	Be aware of condition to include it on a list of differential diagnoses	Be able to recognise the condition	Be able to recognise and assess a patient presenting with the condition	Be able to recognise, assess and initiate management for the condition
Upper airway obstruction					
Epistaxis					
Nasal trauma					
Acute vertigo					
Pinna haematoma					
Tonsillitis					
Peri-tonsillar abscess/ quinsy					
Head and neck foreign bodies					

Orbital cellulitis					

Page 7: Investigations

The aim of this question is to establish which tests a newly qualified doctor at the point of completion of their undergraduate training should know about and to what level.

Investigations

14. With regards to audiological investigations, please rate to what level a newly qualified doctor at the point of completion of their undergraduate training should know about each of the following:

	Not need to know about	Be aware that investigation exists	Understand indications for investigation	Be able to interpret investigation	Understand indications and be able to interpret investigation
Audiometry					
Tympanometry					
Neonatal hearing screening					
Vestibular function tests					

15. Please rate to what level a newly qualified doctor at the point of completion of their undergraduate training should know about each of the following:

	Not need to know about	Be aware that investigation exists	Understand indications for investigation	Be able to perform investigation	Be able to interpret	Be able to perform and interpret investigation
Allergy testing	○	○	○	○	○	○
Throat swabs	○	○	○	○	○	○
Tests for glandular fever	○	○	○	○	○	○

Page 8: Procedures

16. Please indicate the level a newly qualified doctor at the point of completion of their undergraduate training should be at with regards to the following procedures:

	No need to have heard of	Have heard of	Should be aware of the indications for	Should be aware of the indications for, and have observed the procedure	Should be aware of the indications for, have observed and can perform the procedure
Cricothyroidotomy					
Nasendoscopy					
Videostroboscopy					
Indirect laryngoscopy					
Fine needle aspiration for cytology					

17. Please indicate the level a newly qualified doctor at the point of completion of their undergraduate training should be at with regards to the following procedures:

	No need to have heard of	Have heard of	Should be aware of the indications for	Should be aware of the indications for, and have observed the procedure	Should be aware of the indications for, have observed and can perform the procedure
Nasal packing	◌	◌	◌	◌	◌
Nasal cautery	◌	◌	◌	◌	◌
Grommet/ ventilation tube insertion	◌	◌	◌	◌	◌
Mastoid surgery	◌	◌	◌	◌	◌
Functional endoscopic sinus surgery	◌	◌	◌	◌	◌
Tracheostomy	◌	◌	◌	◌	◌
Tonsillectomy	◌	◌	◌	◌	◌
Septoplasty	◌	◌	◌	◌	◌

Page 9: Psychosocial

18. Please rate how important you feel it is for a newly qualified doctor at the point of completion of their undergraduate training to know about:

	Not important at all	Of little importance	Of average importance	Very important	Essential
Educational consequences of hearing loss					
Social consequences of hearing loss					
Effective communication with a hearing impaired individual					
The multidisciplinary team approach to deafness					
The importance of voice in verbal and non-verbal communication					
Communicating with laryngectomees					
The multidisciplinary team approach to voice disorders					
Behavioural and psychological factors which may contribute to ENT conditions (eg globus)					

Psychosocial consequencies of prolonged vertigo					

Page 10: Clinical conditions

Clinical conditions are listed in many of the current UK medical schools ENT curricula. These vary between schools both in terms of conditions taught and to what level the student should know about them.

In this next section we have collated what is currently taught and aim to establish a level to which a newly qualified doctor should be expected to know.

Page 11: Otology 1/2

Hearing

19. Please rate to what level a newly qualified doctor at the point of completion of their undergraduate training should know about the following conditions:

	Should not be included in an undergraduate curriculum	Be aware of condition to include it on a list of differential diagnoses	Be able to take a history and examine a patient appropriately for this condition	Be able to organise appropriate investigations for this condition (if required)	Be able to manage this condition
Ototoxicity					
Otosclerosis					
Presbyacusis					
Noise induced hearing loss					
Congenital hearing loss					
Conductive hearing loss					
Sensorineural hearing loss					
Auditory processing disorder					

Balance

20. Please rate to what level a newly qualified doctor at the point of completion of their undergraduate training should know about the following conditions:

	Should not be included in an undergraduate curriculum	Be aware of condition to include it on a list of differential diagnoses	Be able to take a history and examine a patient appropriately for this condition	Be able to organise appropriate investigations for this condition (if required)	Be able to manage this condition
Vestibular neuritis/labyrinthitis					
Meniere's disease					
Benign paroxysmal positional vertigo					
Vestibular migraine					
Presbyastasis					

Page 12: Otology 2/2

Infections and inflammation

21. Please rate to what level a newly qualified doctor at the point of completion of their undergraduate training should know about the following conditions:

	Should not be included in an undergraduate curriculum	Be aware of condition to include it on a list of differential diagnoses	Be able to take a history and examine a patient appropriately for this condition	Be able to organise appropriate investigations for this condition (if required)	Be able to manage this condition
Complications of middle ear disease					
Acute otitis media					
Chronic otitis media (including cholesteatoma)					
Chronic otitis media with effusion (glue ear)					
Otitis externa					
Mastoiditis					
Aural granulations/polyps					

Other

22. Please rate to what level a newly qualified doctor at the point of completion of their undergraduate training should know about the following conditions:

	Should not be included in an undergraduate curriculum	Be aware of condition to include it on a list of differential diagnoses	Be able to take a history and examine a patient appropriately for this condition	Be able to organise appropriate investigations for this condition (if required)	Be able to manage this condition
Vestibular schwannoma					
Barotrauma					
Eustachian tube dysfunction					
Facial nerve palsy					
Tympanic membrance perforation					
Tinnitus					
Tympanosclerosis					
Chondrodermatitis nodularis helicis					

Page 13: Rhinology

23. Please rate to what level a newly qualified doctor at the point of completion of their undergraduate training should know about the following conditions:

	Should not be included in an undergraduate curriculum	Be aware of condition to include it on a list of differential diagnoses	Be able to take a history and examine a patient appropriately for this condition	Be able to organise appropriate investigations for this condition (if required)	Be able to manage this condition
Allergic rhinitis					
Non-allergic rhinitis					
Acute rhinosinusitis					
Chronic rhinosinusitis (including polyps)					
Septal deviation					
Atypical facial pain					

Page 14: Laryngology

24. Please rate to what level a newly qualified doctor at the point of completion of their undergraduate training should know about the following conditions:

	Should not be included in an undergraduate curriculum	Be aware of condition to include it on a list of differential diagnoses	Be able to take a history and examine a patient appropriately for this condition	Be able to organise appropriate investigations for this condition (if required)	Be able to manage this condition
Benign vocal cord lesions					
Laryngeal papillomatosis					
Laryngomalacia					
Muscle tension dysphonia					
Vocal cord palsy					
Laryngitis					
Epiglottitis					
Croup					

Page 15: Other clinical problems

25. Please rate to what level a newly qualified doctor at the point of completion of their undergraduate training should know about the following conditions:

	Should not be included in an undergraduate curriculum	Be aware of condition to include it on a list of differential diagnoses	Be able to take a history and examine a patient appropriately for this condition	Be able to organise appropriate investigations for this condition (if required)	Be able to manage this condition
Salivary gland disorders					
Thyroid disorders					
Thyroglossal duct cyst					
Branchial cyst					
Pharyngeal pouch					
Obstructive sleep apnoea					
Globus pharyngeus					
Laryngopharyngeal reflux					
Pharyngitis					

Page 16: Head and neck

Head and neck cancers

26. Please select **ALL** options which you feel are important for a newly qualified doctor at the point of completion of their undergraduate training to know about:

	Aetiology	Presentation	Red flags	Staging	Management	Prognosis
Laryngeal cancer						
Pharyngeal cancer						
Nasal tumours						
Salivary gland malignancy						
Thyroid gland malignancy						
Skin malignancy						
Malignant lymph node of unknown origin						

Page 17: Your comments, suggestions and/or opinions (optional)

27. Please use the space below to indicate any areas which you think should be covered by undergraduate ear, nose and throat curriculum that have not already been mentioned in this survey.

28. We would be delighted to hear any thoughts or comments on the curriculum project. Please feel free to share your thoughts below

Please click the 'Finish' button to record your survey responses and for a link to the draw for the Amazon.co.uk vouchers.

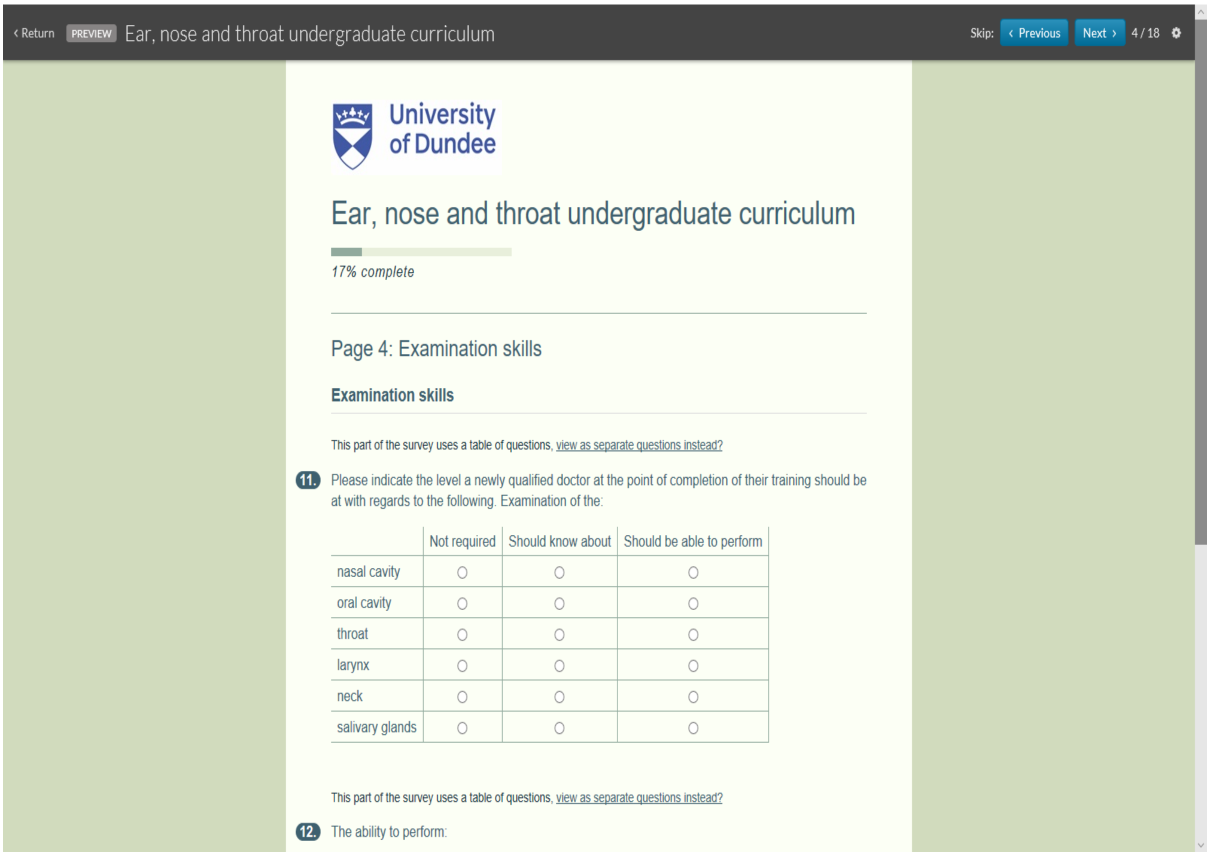
Page 18: Further information about the undergraduate ENT curriculum project

If you would like to know more about the project or get involved then please feel free to get in contact at r.steven@dundee.ac.uk

Otherwise, please let me take this chance to once again thank you for taking the time to complete this survey and helping to inform what we teach the doctors of the future.

Respondents can now leave the survey. Please follow this link to enter contact details for the prize draw for the Amazon.co.uk vouchers:
https://dundee.onlinesurveys.ac.uk/prizedraw

Appendix 5: Screen shot of online appearance of questionnaire as seen by participants



‹ Return PREVIEW Ear, nose and throat undergraduate curriculum

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University of Dundee

Ear, nose and throat undergraduate curriculum

17% complete

Page 4: Examination skills

Examination skills

This part of the survey uses a table of questions, view as separate questions instead?

11. Please indicate the level a newly qualified doctor at the point of completion of their training should be at with regards to the following. Examination of the:

	Not required	Should know about	Should be able to perform
nasal cavity	○	○	○
oral cavity	○	○	○
throat	○	○	○
larynx	○	○	○
neck	○	○	○
salivary glands	○	○	○

This part of the survey uses a table of questions, view as separate questions instead?

12. The ability to perform:

Appendix 6: Focus group invitation emails

Focus group invitation emails

Dear Colleague,

I am writing to you in your position as FY/CT/ST doctors / GPs working in GPPC / Teaching leads for departments in Ninewells hospital.

I am an ENT trainee in Ninewells and I am currently working as a clinical fellow in education. I am leading a project looking at what we teach medical students about ENT, supervised by Professor Mires and approved by the ENTUK undergraduate curriculum development team.

We have recently completed a nationwide survey looking at what doctors feel medical students should learn about Ear, Nose and Throat surgery. The survey results have been extremely interesting and we are now keen to explore these in more detail. To do this we would like to hear the opinions of doctors to further define what we are teaching and why we are teaching it.

The study involves a short focus group which is estimated to last 1 hour with refreshments provided.

I realise that your time is extremely valuable but if you would be interested in participating I would be most grateful. I have attached a participant information sheet for more information.

Many thanks.

Yours sincerely,

Richard Steven

Appendix 7: Focus group participant information sheet

PARTICIPANT INFORMATION SHEET

An evidence based approach to development of an undergraduate Ear, Nose and Throat curriculum

INVITATION TO TAKE PART IN A RESEARCH STUDY

We would be most grateful for your participation in this research study which aims to explore what is taught in the undergraduate Ear, Nose and Throat (ENT) curriculum and attempts to define core elements of this.

This study involves focus groups with a small group of doctor colleagues.

This is a national project which has the approval of the ENTUK undergraduate curriculum development team. The main researcher is Richard Steven, an ENT Specialty Trainee in the East of Scotland and Clinical Fellow in Medical Education. The project is supervised by Professor Gary Mires and Dr Sean McAleer of the University of Dundee.

PURPOSE OF THE RESEARCH STUDY

The aim is to inform what we teach medical students about ENT and make this as relevant to practicing doctors as possible.

The first stages of this study are now complete. In these a questionnaire was devised and distributed nationally to obtain the views of a large number of doctors on what a graduating medical student should know about ENT surgery.

In this current phase of the study we would like to undertake focus groups to explore the views and opinions of doctors regarding what is taught to medical students about ENT surgery and explore the results of the national questionnaire.
The focus groups will be audio-recorded and recordings transcribed anonymously.

TIME COMMITMENT

The focus group is estimated to last 1 hour on one occasion only. Refreshments will be provided. We aim to make these sessions as convenient for you as possible and therefore propose to conduct them within Ninewells Hospital, the Medical School or surrounding buildings at the group's convenience.

COST, REIMBURSEMENT AND COMPENSATION

Your participation in this study is entirely voluntary.
We can provide evidence of your participation if required.

RISKS

There are no known risks for you in this study.

TERMINATION OF PARTICIPATION

You can decide to stop being a part of this research study at any time without explanation and without penalty.

Following audio transcription and anonymisation of data, it may not be possible to identify and remove your responses at that stage.

CONFIDENTIALITY/ANONYMITY

The data collected will not contain any personal information about you except general data such as gender, specialty and grade.

The audio recordings will be kept until the final report is completed, after which they will be destroyed.

The transcribed data from the audio recordings may be used anonymously in publications and presentations.

FOR FURTHER INFORMATION ABOUT THIS RESEARCH STUDY

I would be more than happy to answer any questions you may have about this study at any time. I can be contacted by email at r.steven@dundee.ac.uk

The University Research Ethics Committee of the University of Dundee has reviewed and approved this research study.

Many thanks for taking the time to read this information.

Appendix 8: Focus group consent form

CONSENT FORM

An evidence based approach to development of an undergraduate ear, nose and throat curriculum

As the field of medicine continues to expand it is important for us to ensure that what we teach is up to date and relevant for the doctors of the future.

This national collaborative project, with the approval of the ENTUK undergraduate curriculum development team, aims to provide an evidence base for what is taught to medical students by collecting data about core elements of knowledge, skills and attitudes used by practising doctors which are pertinent to the study of ear, nose and throat surgery at an undergraduate level.

You are welcome to withdraw from the research at any point, however, once the data has been analysed it may not be possible to identify and remove your responses due to the anonymisation of data.

By signing below you are indicating that you have read and understood the Participant Information Sheet and that you agree to take part in this research study.

___________________________________ ___________________

Participant's signature Date

____

Participant's name

___________________________________ ___________________

Signature of person obtaining consent Date

____

Name of person obtaining consent

"I agree to the audio recording of the interview and that this may be used anonymously in publications and presentations" YES ☐ NO ☐